



**U.S. Army
Environmental
Center**

Storm Water Permits for Construction Activities

A Guide for Installations

29 March 1996

Prepared for:

U.S. Army Environmental Center
Aberdeen Proving Ground,
Maryland 21010-5401

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Prepared by:

Logistics Management Institute
2000 Corporate Ridge
McLean, Virginia 22102-7805

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Preface

OBJECTIVES OF THE GUIDE

A major goal of the Army's storm water program is to minimize the impacts of installation activities on local water quality in the most cost-effective manner. To support this goal, this guide provides administrative guidance for installation environmental staff regarding their compliance duties associated with construction activities at Army installations. This guide is not intended to be used as a policy or operations document. It can be used as a stand-alone guide or as an appendix to training manuals for new installation environmental staff members.

ORGANIZATION OF THIS GUIDE

This guide is organized to provide step-by-step procedures, accompanying worksheets, answers to commonly asked questions, and additional references to guide the reader through the permitting process in the most efficient manner. It is meant to complement existing documents from the U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers by providing practical advice for the installation environmental personnel responsible for managing storm water permits. This guide is divided into the following sections:

- ◆ An overview and history of the general storm water regulations (Chapter 1)
- ◆ Roles and responsibilities of installation staff responsible for managing construction activities subject to storm water regulations (Chapter 1 and appendices)
- ◆ Guidelines for obtaining a National Pollutant Discharge Elimination System storm water permit for construction activities (Chapter 2)
- ◆ Step-by-step procedures to develop and implement a Storm Water Pollution Prevention Plan for construction activities (Chapter 3)
- ◆ Summary of state construction permit requirements, available references, sample checklists and worksheets, forms and letters, and a list of the Army points of contact involved with the storm water program (Appendices A through F)
- ◆ Glossary (Appendix G).

Contents

Chapter 1. Storm Water Regulations and Personnel Responsibilities for Construction Activities at Installations	1-1
Chapter Objectives	1-1
Overview of Storm Water Regulations	1-1
Understanding the Construction Process and Permitting Requirements	1-4
Responsibilities of the Installation Offices, USACE Districts, and Private Contractors	1-5
Further Assistance and Information	1-13
Chapter 2. The NPDES General Permit Requirements for Storm Water Discharges Associated with Construction Activities	2-1
Chapter Objectives	2-1
Permit Background	2-1
Notice of Intent Requirements	2-2
Storm Water Pollution Prevention Plan for Construction Activities	2-3
Best Management Practices for Construction Activities	2-5
Summary of Certification Requirements	2-6
Monitoring and Inspection Requirements	2-6
Non-Storm-Water Discharges	2-7
Notice of Termination Requirements	2-7
Record-Keeping Requirements	2-7
Penalties for Noncompliance	2-8
State General Permit Requirements	2-8
Chapter 3. Preparing Storm Water Pollution Prevention Plans for Construction Activities	3-1
Chapter Objectives	3-1
Developing and Implementing an SWPPP for Installation- Managed Projects	3-1

Contents (Continued)

- Appendix A. Summary of State and Federal General Permits for Storm Water Discharges Associated with Construction Activity — 1996
- Appendix B. Sample Construction Pollution Prevention Plan
- Appendix C. Available References for Storm Water Discharges Associated with Construction Activities
- Appendix D. Sample Checklists and Forms for the Construction General Permit
- Appendix E. Points of Contact for the Army Storm Water Program
- Appendix F. U.S. Army Corps of Engineers: Commonly Asked Storm Water Questions and Answers
- Appendix G. Glossary

CHAPTER 1

Storm Water Regulations and Personnel Responsibilities for Construction Activities at Installations

CHAPTER OBJECTIVES

This chapter discusses the storm water permitting, planning, and implementation phases of regulated construction (also referred to as ground-disturbing) activities on Army installations. It also identifies typical roles and responsibilities of the environmental staff, U.S. Army Corps of Engineers (USACE), and private contractors.

At the completion of this chapter, readers should understand the regulatory background, understand the construction process at the installation, identify responsibilities of each participant, incorporate helpful hints into installation policies and construction contracts, and know where to go for more information and assistance.

OVERVIEW OF STORM WATER REGULATIONS

Why Does EPA Regulate Storm Water Discharges from Construction Sites?

According to the U.S. Environmental Protection Agency's (EPA's) National Water Quality Inventory, polluted storm water runoff causes most of the damage to the Nation's rivers, lakes, and streams. The most frequently identified pollutant is soil carried by storm water runoff through point and nonpoint discharges from ground-disturbing activities such as construction. To address that problem, the Federal Water Pollution Control Act (Section 402[p] of the 1987 Amendments), commonly referred to as the Clean Water Act (CWA), requires operators of certain construction activities to obtain National Pollutant Discharge Elimination System (NPDES) permits for point-source discharges of storm water into waters of the United States.

Although construction activities can release many different pollutants, the greatest impact on water quality is from soil erosion. Grading activities that remove grass, rocks, pavement, and other protective ground covers expose the underlying soil to the elements. When the ground surface is unprotected, soil and sand particles are easily eroded (i.e., they are picked up by the wind or washed

away by rain or melting snow). The water carrying these particles eventually reaches a stream, river, or a lake where it slows down, allowing the particles to settle to the bottom. This process is called sedimentation. Layers of clays and sediments build up in the stream beds, choking the river and stream channels and covering the habitat where fish spawn and plants grow. Sediment in the water can also cause respiration problems for fish and prevent light from reaching the plants growing in the water column.

Clearing, grading, or otherwise altering previously undisturbed land increases the erosion rate by as much as 1,000 times the preconstruction rate. Millions of tons of sediment are generated annually by the construction activities in the United States alone. In addition to the heavy sediment loadings, construction activities can release excess nutrients (such as phosphorous and nitrogen), petroleum products, waste chemicals (such as solvents and caustics), and solid wastes. Transported off-site by storm water, these materials can harm aquatic organisms and degrade water quality.

Are Storm Water Discharges from Construction Activities Covered by the Installation's NPDES General Storm Water Permit?

Storm water discharges from regulated construction sites on the installation are not covered under the installation's storm water baseline general, multisector or individual permit for industrial activities. The CWA Amendments of 1987 directed the EPA to develop regulations for storm water discharges associated with certain activities that can pollute storm water runoff. The EPA's final storm water regulations, published on 16 November 1990, listed 11 types of industrial activities requiring an NPDES permit for storm water runoff.¹

Although construction activity is one of the 11 listed activities, the EPA developed a separate, though similar, permit for certain construction activities. Each construction activity requires a separate storm water construction permit if it (1) meets the EPA's definition of a construction activity, (2) disturbs five acres or more of land, and (3) results in a point-source discharge into waters of the United States.

Similar to the storm water permitting process for other industrial activities,² the EPA issues both general NPDES permits and individual NPDES permits for storm water discharges from construction activities. General permits contain preventive measures and monitoring requirements that apply to typical construction activities. The regulatory agency will issue an individual permit when the characteristics of a particular site warrant special preventive measures or monitoring requirements.

¹*Federal Register*, "National Pollutant Discharge Elimination System (NPDES) Permit Application Regulations for Storm Water Discharges," Volume 55, No. 222, Section VI (B), 16 November 1990.

²U.S. Army Environmental Center, *Army Storm Water Permit Implementation Handbook*, 1994.

What Is the EPA's Definition for a Regulated Construction Activity?

A regulated construction activity is defined in Title 40 of the Code of Federal Regulations (40 CFR) 122.26(b)(14)(x) to include

... all clearing, grading, and excavation activities, except operations that result in the disturbance of less than five acres [some states with NPDES permitting authority regulate sites smaller than five acres]³ of total land area which are not part of a common plan of development or sale.

The USAEC will use the *Environmental Alert* newsletter to inform the installations of any changes in EPA's definition. Refer to Appendix F for information on how the five-acre rule applies to separate construction projects that collectively exceed five acres.

What Is the EPA Definition for a Storm Water Point-Source Discharge?

The EPA defines "storm water" as

... storm water runoff, surface water runoff, street wash waters related to street cleaning or maintenance, infiltration (other than infiltration contaminated by seepage from sanitary sewers or by other discharges) and drainage related to storm events or snow melt.⁴

A "point-source discharge" is defined in 40 CFR 122.2 as

... any discernible confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collecting system, or vessel or other floating craft from which pollutants are or may be discharged. The term does not include return flows from irrigated agriculture or agricultural storm water runoff.

This definition includes "conveyances" that were not created by the "discharger," as long as they are "reasonably likely to be the means by which pollutants are ultimately deposited into [waters of the United States]."⁵

³ After the EPA published Phase I regulations of the National Storm Water Program, the Natural Resource Defense Counsel (NRDC) filed suit against the EPA on several issues. The NRDC suit claimed, inter alia, that the EPA had no scientific or technical basis for choosing a five-acre cutoff for permit requirements. On 4 June 1992, the 9th Circuit United States Court of Appeals' remanded this five-acre rule. The court may rule that the existing permit requirement for greater than five acres may be modified or eliminated. The EPA made it clear in the 18 December 1992 *Federal Register* that the existing five-acre limitation remains in effect until further studies are done.

⁴ *Federal Register*, "National Pollutant Discharge Elimination System (NPDES) Permit Application Regulations for Storm Water Discharges," Volume 55, No. 222, Section VI (B), 16 November 1990, p. 47995.

⁵ *Ibid.*, p. 47997.

UNDERSTANDING THE CONSTRUCTION PROCESS AND PERMITTING REQUIREMENTS

Many types of regulated construction activities occur on Army installations; usually, several different offices are involved. It is important, therefore, that the environmental staff understand the entire permitting process to ensure that responsibilities are clearly delegated to the appropriate offices.

Since the EPA's definition for a regulated construction activity is quite broad, it can include ground-disturbing activities that are not usually considered as "construction" in the traditional sense. The environmental staff must understand the definition of a regulated construction activity in order to evaluate whether certain activities require a permit.

Who Is Usually Involved with Ground-Disturbing and Construction Activities Occurring on the Installation?

Construction activities occurring at an installation are usually a collaborative effort among the installation, USACE, and private contractors. Personnel from some or all of the following offices can be involved:

- ◆ Engineering Services Office
- ◆ Environmental Office
- ◆ Contracting Office
- ◆ Storm Water Pollution Prevention Team
- ◆ USACE District Office
- ◆ Military training units
- ◆ Private contractors
 - ▶ architectural-engineering (A-E) firm (design phase)
 - ▶ general contracting firm (implementation phase).

Who Is Responsible for Ensuring That Regulated Construction Activities Comply with the Law?

The installation commander is ultimately responsible for activities taking place on the installation, but he/she usually delegates compliance responsibility to the Environmental Office (EO), USACE, or private contractor. They are then

charged with obtaining and complying with all applicable storm water permits related to construction activities where the installation is the permittee. The installation environmental office is best suited to ensure that the commander understands her/his environmental responsibilities and clearly delegates these responsibilities (if applicable) to the appropriate party.

Installations manage the majority of, but not all, ground-disturbing activities occurring at the installation.⁶ For example, the USACE, usually through private contractors, manages most large construction projects at Army installations and therefore may be responsible for obtaining all the related permits. In some cases, the installation and the USACE share site management responsibilities and may be named as copermittees on a storm water permit. This situation is described in more detail in Chapter 2.

RESPONSIBILITIES OF THE INSTALLATION OFFICES, USACE DISTRICTS, AND PRIVATE CONTRACTORS

What Are the Installation Environmental Office's Responsibilities?

Typically, the EO is responsible for considering the environmental consequences of installation activities and managing the appropriate administrative duties according to the applicable environmental regulations.

Generally, the EO, in conjunction with the Engineering Services Office (ESO) or the USACE, must

- ◆ identify projects that require a permit;
- ◆ obtain an appropriate permit;
- ◆ develop and implement a Storm Water Pollution Prevention Plan (SWPPP) for construction activities;
- ◆ include the storm water permit provisions in the request for proposals and contracts for construction activities;
- ◆ ensure accountability through the use of certifications;
- ◆ inspect the construction or ground-disturbing activity;
- ◆ maintain and store SWPPP and associated records;
- ◆ coordinate with state and local authorities;

⁶Telephone survey of 12 Army installations of various sizes from the Army Materiel Command (AMC), Forces Command (FORSCOM), and Training and Doctrine Command (TRADOC) conducted by the Logistics Management Institute (LMI) in February 1994.

- ◆ budget for necessary time and funds; and
- ◆ update installation operating procedures to clarify storm water compliance duties.

The following subsections provide an overview of the typical installation compliance duties regarding storm water discharges from construction sites.

IDENTIFY PROJECTS THAT REQUIRE A PERMIT

Various ground-disturbing projects on Army installations fall under the EPA definition of a regulated construction activity. In addition to traditional construction activities, some nontraditional ground-disturbing activities meet the EPA definition of a regulated construction activity and may require a permit. Typical activities that may require a permit include

- ◆ clearing of a drop zone;
- ◆ clearing of impact area or demolition area;
- ◆ grading activities associated with demolition or remediation;
- ◆ excavation associated with demolition or remediation;
- ◆ new road building or full-depth reconstruction of existing roads;
- ◆ construction of housing units, offices, training facilities, or commissaries; and
- ◆ combat engineer company training activities.

These activities require a storm water permit for construction activities as long as they (1) disturb five acres⁷ or more of land and (2) result in a point-source discharge into a water of the United States. Since the definition given by the EPA of activities is quite broad, installations should contact the appropriate Federal, state, and local regulators to determine whether an activity is regulated.

OBTAIN AN APPROPRIATE PERMIT

Once the installation staff identifies a regulated construction activity, the EO must obtain the appropriate permits or delegate that responsibility to the ESO, USACE, or private contractor. In most instances, the installation requests coverage under the Federal or state general permit for storm water discharges from construction activities. Unlike other NPDES permits, this permit does not

⁷Check state or local regulations to see if areas less than five acres are regulated by state or local regulations. Appendix A contains a summary of state minimum acreage requirements.

establish discharge limits, but instead describes conditions that must be met to discharge storm water from the site.

Applying for a general permit requires permittees to submit plans describing how they will comply with the conditions listed in the general permit. Such plans are called the Storm Water Pollution Prevention Plans, or SWPPPs.

Installation staff members should contact the appropriate Federal EPA or state regulator to request the complete general permitting package containing specific instructions and application forms. Chapter 2 discusses the major sections of the Federal EPA's NPDES general permit and describes how an installation can obtain coverage. Appendix A summarizes the permit requirements and point of contact (POC) information for each state.

DEVELOP AND IMPLEMENT AN SWPPP FOR CONSTRUCTION ACTIVITIES

The preparation and implementation of an SWPPP is the basic requirement of any storm water permit and can be organized in six steps as shown in Table 1-1. The six steps in preparing an SWPPP are (1) evaluate the construction site, (2) calculate runoff, (3) select site controls, (4) certify the SWPPP and make notification, (5) implement the SWPPP and start construction, and (6) stabilize the site and terminate the permit. Chapter 3 presents the six steps needed to prepare a SWPPP in greater detail.

INCLUDE THE STORM WATER PERMIT PROVISIONS IN THE REQUEST FOR PROPOSALS AND CONTRACTS FOR CONSTRUCTION ACTIVITIES

The general permit and, if already prepared, the SWPPP should be physically attached to, or fully incorporated within, the request for proposals (RFP) form or contract with the A-E firm and general contractor. In addition, a special provision should be included in the contract to put the contractor on notice that it will be bound by the terms of the permit and the SWPPP. Engineering Circular No. 1110-1-79, *Engineering and Design Environmental Protection Guide Specification*, prepared by USACE in March 1994, provides environmental compliance provisions for Army construction contracts.

Since the storm water permit conditions are basically contract requirements, the installation engineer or environmental personnel should administratively enforce them as they would any other contract requirement. In the event that violations occur, the EPA and/or state may require other specific enforcement actions to correct the problem. Contracts should direct the contractor to assume responsibility for any actions required as a result of failure to comply with the general permit. Installation environmental personnel must direct all corrective actions through the appropriate contracting officer.

Table 1-1.***Installation SWPPP Responsibilities for Construction Activities***

Steps in preparing an SWPPP	Installation responsibilities
<i>Step 1:</i> Evaluate the construction site or ground-disturbing activity to determine if it requires a storm water permit.	<p><i>ESO</i> — Develop the RFP to include SWPPP requirements. Attach or reference the general permit to the RFP for A-E firm.</p> <p><i>EO</i> — Review the RFP to ensure it contains the SWPPP for each project plan or develop an in-house SWPPP.</p> <p><i>A-E firm (if contracted)</i> — Collect data and prepare plan.</p>
<i>Step 2:</i> Assess the impact of the storm water discharges by calculating the runoff coefficient and discharge rates from the site for both preconstruction and postconstruction states.	<p><i>ESO/EO</i> — Review A-E calculations for adequacy or calculate required information.</p> <p><i>A-E firm (if contracted)</i> — Calculate required information.</p>
<i>Step 3:</i> Select site controls and prepare the SWPPP.	<p><i>ESO/EO</i> — Review draft plan for adequacy or select controls and complete plan in house. Attach the general permit and the SWPPP to the RFP for the general contractor (if applicable).</p> <p><i>A-E firm (if contracted)</i> — Complete the SWPPP, prepare a description of controls, and prepare the sequence of events.</p>
<i>Step 4:</i> Certify the SWPPP and notify the regulators and the public.	<p><i>ESO/EO</i> — Obtain required signatures on the SWPPP, submit the NOI, and facilitate public access to the SWPPP.</p> <p><i>General contractor (if applicable)</i> — Sign contractor certification and comply with contract requirements.</p>
<i>Step 5:</i> Implement the SWPPP and start construction or ground-disturbing activity.	<p><i>ESO/EO</i> — Inspect the construction site or ground-disturbing activity and ensure the SWPPP is updated.</p> <p><i>General contractor (if applicable)</i> — Implement and inspect controls and notify the ESO/EO of changes or releases.</p> <p><i>Contracting office</i> — Ensure contracts are being followed and amended as needed.</p>
<i>Step 6:</i> Stabilize the site, submit an NOT when construction ends, and store the appropriate records for the required time.	<p><i>ESO/EO</i> — Inspect the site and ensure post controls are in place, submit the NOT to the EPA, and store related records.</p> <p><i>General contractor (if applicable)</i> — Stabilize the site as required in the SWPPP and notify the ESO/EO.</p>

ENSURE ACCOUNTABILITY THROUGH THE USE OF CERTIFICATION

All correspondence, reports, SWPPPs, notices of intent (NOIs), NOTs, or other information submitted to the regulatory officials must be signed by the "authorized official." For the storm water permit requirements, an authorized official is a "senior executive officer responsible for the overall operation of a principal geographic unit of the agency." That operator can be either the installation commander or USACE district engineer. However, the installation commander or USACE district engineer may designate a representative installation engineer, environmental coordinator, division chief, or branch chief to be responsible for handling and signing all appropriate documents. The signatory authority must be delegated in writing and submitted to the regulatory agency having jurisdiction. A sample delegation letter is in Appendix D. In signing the plan, the authorized representative assumes liability for the plan and certifies that the information is true.

INSPECT THE CONSTRUCTION OR GROUND-DISTURBING ACTIVITY

Storm water control measures must be inspected at regular intervals as well as after every significant rainfall.⁸ Although the inspection is usually a contractor's responsibility, the installation (or USACE district), as well as the contractor, may receive a notice of violation (NOV) for noncompliance. Therefore, it would be prudent to have personnel from the installation's environmental office (or USACE representative) periodically inspect site conditions to ensure that the installation's personnel or contractors are meeting contract requirements.

Since contractors usually are responsible for complying with the specific inspection schedule, they should have the appropriate inspection forms on site. Installation personnel can then review the records to ensure they were filled out at the required intervals. The general permits also require site operators to inspect the control measures (i.e., best management practices [BMPs]) after a significant rain event. Therefore, the contractor either must have a rain gauge on site or be able to easily obtain the information.

Installation or contractor personnel performing site inspections should be experienced in construction, erosion, and sediment-control practices. Although the EPA's general permit does not have specific training requirements for site inspectors, some authorized states do. Check with the state permit to determine the inspector's qualifications. In general, installation or contractor personnel should be familiar with the following:

- ◆ Storm water regulations
- ◆ Location and type of potential problems and control measures
- ◆ Construction requirements for the control measures

⁸See Chapter 2 for the Federal inspection requirements and Appendix A for a summary of the state inspection requirements.

- ◆ Inspection and maintenance record-keeping requirements
- ◆ Site housekeeping and material management practices
- ◆ Spill response requirements.

Chapter 3 details site inspection requirements.

MAINTAIN AND STORE SWPPP AND ASSOCIATED RECORDS

The installation must maintain records for each permitted construction activity for three years after submitting the NOT. Therefore, the installation ESO (or delegated office) must arrange for file storage and ensure that the site operators (contractor or Corps engineer) submit final copies of the

- ◆ SWPPP,
- ◆ NOI,
- ◆ certifications (authorized person and contractors),
- ◆ inspection reports,
- ◆ maintenance reports,
- ◆ construction activity reports,
- ◆ related correspondence with regulators, and
- ◆ NOT.

For organizational purposes, records should be retained in a binder (or project file) with the NPDES permit number, construction activity title, and the construction dates noted on the spine of the binder. This will facilitate data storage and data retrieval.

COORDINATE WITH STATE AND LOCAL AUTHORITIES

Although similar to the Federal permitting process, most states have the authority to adopt stricter permit requirements for Federal facilities. Therefore, it is important that installation personnel contact the state storm water POC or the local Soil Conservation Service for more information about permit requirements, BMP appropriateness, and design specifications for that specific area. Appendix A lists the state POCs.

BUDGET FOR NECESSARY TIME AND FUNDS

As with any regulatory requirement, installations may have to budget for additional funds for permitting construction or ground-disturbing activities to cover additional direct and indirect costs. Most direct costs will be covered in the construction contract since the contractor will be required to comply with the regulations. However, the installation may incur some additional project related costs if the storm water requirements were not included in the original contract provisions or if the installation is conducting its own ground-disturbing activities. To develop current cost estimates for BMPs, use the latest cost data and site information.

The installation EO may also incur costs to administer a permit, prepare an SWPPP, and implement required BMPs at installation-managed, ground-disturbing activities. The USACE estimates that it takes on average an additional 2 to 3 person-days to review the plans and fill out the permit application (NOI) for an ordinary construction project. The additional staff time is also required because ongoing administrative tasks will vary with the number of construction projects managed and the size of each.

UPDATE INSTALLATION OPERATING PROCEDURES TO CLARIFY STORM WATER COMPLIANCE DUTIES

Similar to contracts specifying the storm water duties for contractors, the installation operating procedures should clearly state the responsibilities of installation offices, USACE, and private contractors. The EO should review all installation operating procedures associated with construction activities and ensure they reference the appropriate regulations and delegate storm water compliance duties.

What Are the District Engineer's Responsibilities for USACE-Managed Construction Activities?

The USACE is responsible for all permits associated with Corps-managed construction projects and, therefore, should apply for any needed storm water permits. However, the Corps may use contractors to prepare the NOI, SWPPP, or other permit requirements.

Although unlikely, some cost-shared projects may involve storm water discharges that continue beyond the completion of the project. In these cases, the installation should apply for the storm water permits covering these continuing discharges. The Corps would still apply for those permits covering the actual construction.

The USACE will usually obtain the appropriate storm water permits (either individual or general) prior to completion of the design phase of a project. This ensures that any changes to the SWPPP can be made, or any specific permit

requirements can be addressed, prior to concluding any contractual relationship it may have with a design firm. This also ensures that the SWPPP and any specific permit requirements are acceptable prior to the issuance of a solicitation for the construction phase of the project.

It is important to note that even when construction activities at the installation are managed by the Corps, the regulating agency may send any NOV to an installation if it is listed on the permit. Installations should always clarify permitting responsibilities when USACE manages projects on installation property.

What Are the Contractor Responsibilities?

Construction activities on Army installations can involve many different (A-E) contractors and subcontractors during the project planning phase and the construction phase. The installation can (and in most cases should) transfer most of the permitting responsibilities to the contractor by identifying those responsibilities in the RFP and contracts. Depending on the contractual agreement, the A-E firm can be responsible for developing the SWPPP, while the general contractor can be responsible for preparing and submitting the NOI, implementing the SWPPP, and submitting the NOT.

Regardless of the contractual relationship, since the general contractor is responsible for the day-to-day operations at the site, it incurs some responsibility under the regulation. In some instances, the general contractor may be responsible for filing an NOI along with the installation. Also, it is responsible for reviewing and signing the SWPPP. By signing the SWPPP, the contractor acknowledges the terms and conditions of the permit and SWPPP. An example of a contractor's certification form is in Appendix D.

If possible, the SWPPP and general permit should be included in the RFP. Once site activity starts, the general contractor is responsible for constructing and inspecting the site controls prescribed in the SWPPP. The responsibilities of the general contractor with respect to the NPDES storm water permit are as follows:

- ◆ File the NOI (as described previously).
- ◆ Implement the storm water management activities and other measures stated in the SWPPP. The SWPPP must identify the general contractor.
- ◆ Sign a certification acknowledging the terms and conditions of the permit.

Subcontractors do not need to submit an NOI if the general contractor continues to have day-to-day operational control of the site and has already filed an NOI. However, all subcontractors must be identified by name in the SWPPP, must sign a certification statement showing that they understand the permit requirements, and must implement the measures stated in the SWPPP.

FURTHER ASSISTANCE AND INFORMATION

Can I Order Additional References?

Appendix C lists regulatory manuals, information papers, and design guidance related to storm water discharges from construction sites. This appendix also provides ordering information and costs for the listed references.

Where Can I Find Sample Checklists and Forms for the Construction General Permit?

Appendix D contains the following checklists and sample forms:

- ◆ EPA Construction General Permit Requirement Preconstruction Checklist (D-3)
- ◆ EPA Construction General Permit Construction/Implementation Checklist (D-5)
- ◆ EPA Construction General Permit Final Stabilization/Termination Checklist (D-7)
- ◆ Erosion and Sediment Control Selection Checklist (D-9)
- ◆ Construction General Permit Inspection and Maintenance Report Form (D-11)
- ◆ SWPPP Certification Form (D-13)
- ◆ Notice of Termination Form (D-15)
- ◆ Sample Delegation Letter (D-17)
- ◆ Sample Contractors Certification (D-19).

Who Are the Army Points of Contact for Storm Water Issues?

Appendix E lists the Army POCs for storm water issues.

Does USACE Provide Additional Guidance?

Appendix F presents commonly asked questions with answers provided by the USACE Office of the Chief Counsel.

Is There On-line Assistance?

The Defense Environmental Network Exchange (DENIX) system provides personnel in the environmental arena access to environmental, legislative, compliance, restoration, cleanup, and DoD guidance information through an on-line computer bulletin board system and the Internet's World Wide Web (WWW). Users of DENIX can do the following:

- ◆ Review on-line environmental publications.
- ◆ Send and receive electronic mail via the DENIX host and Internet related to many environmental topics, including storm water issues.
- ◆ Discuss specific questions on various environmental problems (e.g., storm water problems).
- ◆ Access listings of environmental training courses.
- ◆ Upload and download files.
- ◆ Link to other sources of environmental information.

This system has a specific topic area for waste-water-related issues. Contact the DENIX hotline at 1-800-642-3332 to get a user identification password. You can also sign up at the DENIX WWW home page located at <http://denix.cecer.army.mil/denix/denix.html>.

CHAPTER 2

The NPDES General Permit Requirements for Storm Water Discharges Associated with Construction Activities

CHAPTER OBJECTIVES

This chapter discusses in detail the background and specific requirements of the Federal general permit for storm water discharges from construction activities. It also presents the differences between the Federal and state (general) storm water permits for construction sites. At the completion of this chapter, readers should understand the Federal and state permit requirements and associated time lines.

PERMIT BACKGROUND

The EPA published the final NPDES general permit for storm water discharges from construction activities in the *Federal Register* in September 1992.¹ It will expire on 1 October 1997. In order to make the process more efficient and less expensive, EPA developed general permits to cover a broad category of applicants with similar discharges. Instead of limiting the amount of pollution in a discharge, a general permit describes certain conditions that a permit holder must meet in order to discharge storm water from a construction site. These conditions include applying for the permit, developing an SWPPP, implementing best management practices (BMPs), obtaining required certifications, and monitoring and inspecting the site.

Under the general permitting process, applicants submit a site registration application or NOI to comply with the general permit, instead of a longer, more complex individual permit application (e.g., EPA NPDES Form 1-C). However, the general permit does not authorize any non-storm-water discharges from the construction activity.

¹*Federal Register*, "Final NPDES General Permits for Storm Water Discharges from Construction Sites," Volume 57, No. 187, 25 September 1992, pp. 44412 – 44435.

NOTICE OF INTENT REQUIREMENTS

The first step in obtaining coverage under the general permit involves filing an NOI with the EPA or the appropriate state agency. This section explains the purpose of the NOI and the requirements for completing the NOI.

An NOI notifies the state or Federal EPA that the operator of the construction site will comply with the terms of the general permit for construction activities. The Federal NOI requests the site location, owner information, operator (general contractor) information, receiving water, existing NPDES permit number (if any), an indication of existing quantitative data, and a brief description of the project. However, the specific information required on an NOI can differ from state to state. Appendix A presents the telephone numbers of several appropriate state or Federal storm water POCs and a summary of the state NOI requirements. Commonly asked questions concerning the NOI are discussed in the following subsections.

Who Is Responsible for Submitting an NOI?

The NOI is submitted by construction site operators. The EPA defines the term "operator" in two ways:

- ◆ The operator is the person who has operational control over the site specifications. Because the installation engineers or USACE district engineer generally has the ability to change the construction specifications, this definition includes the installation engineer and the USACE district engineer if either of them is managing the construction.
- ◆ The operator has day-to-day operational control over the site activities. Since the general contractor usually maintains the control of the site activities, this definition also encompasses the role of the general contractor.

Under the EPA definitions, either the installation engineer, USACE district engineer, or general contractor can be responsible for filing an NOI. At some sites where the USACE, installation, and general contractor are all involved, all three may have to sign the NOI. In such cases, those organizations will become copermittees. Copermitting can be done in one of the following ways:

- ◆ The installation engineer (or USACE district engineer) and general contractor can file a joint NOI.
- ◆ The installation engineer (or USACE district engineer) and the general contractor can file separate NOIs, but they should be filed at the same time (in the same envelope) to notify the EPA that they pertain to the same activity.
- ◆ The installation engineer (or USACE district engineer) can file an NOI before the general contractor is selected; the general contractor then can file an

amended NOI (which should include both the contractor's and owner's names) before beginning work on the site.

The EO should contact the appropriate state or Federal authority to determine if a specific case requires copermitting.

Who Can Sign the NOI?

If the installation submits the NOI, it must be signed by a responsible (authorized) official such as the installation commander, USACE district engineer, or the chief of the environmental office. If the contractor also submits an NOI along with the installation's submission, it must be signed by a responsible official within the construction company.

When Should the NOI Be Submitted?

Installations seeking coverage under the Federal NPDES construction general permit must submit an NOI form at least two days before construction begins. The site operator (installation or USACE district engineer) must complete the SWPPP prior to submitting an NOI. Appendix A provides more detailed requirements since some states with NPDES permitting authority require the NOI earlier or require a copy of the SWPPP with the NOI.

Also, the installation must submit a new NOI whenever the site operator changes. For example, if a new general contractor assumes control of a construction site at an Army installation, it must submit a new NOI at least two days before beginning work at the site. The permit coverage of the previous operator does not carry forward to the new operator.

STORM WATER POLLUTION PREVENTION PLAN FOR CONSTRUCTION ACTIVITIES

The basic premise of a storm water permit is to develop a clear plan that details how to prevent storm water contamination from occurring in the first place. Commonly asked questions concerning the SWPPP are discussed in the following subsections while Chapter 3 contains a detailed discussion of the SWPPP's contents.

What Is the Purpose of the SWPPP?

The purpose of the plan is to identify sources of erosion or contamination at a construction site and to select and carry out actions that prevent or control pollution from storm water discharges. Also, by preparing and implementing a

site-specific SWPPP, the site operator demonstrates compliance with the EPA or state general permit. The installation (or USACE) must develop a separate site-specific SWPPP for each regulated construction activity.

When Must an Installation Prepare the SWPPP?

The permittee (installation, USACE, or private contractor) must complete the SWPPP prior to submitting the NOI. Federal regulations require that the SWPPP be completed at least 2 days before construction activities begin. However, some authorized states require the SWPPP be completed up to 90 days before construction activities begin. See Appendix A for the state requirements.

Do the Regulators Require a Copy of the SWPPP?

Usually, the Federal regulators do not require that a copy of the SWPPP be submitted with the NOI; it must be kept on site along with the contractor and subcontractor certifications and inspection reports (as described later in this report). However, some states require the site operator to submit a copy of the SWPPP with the NOI. Appendix A lists the states or EPA regions that request a copy of the SWPPP with the NOI.

What Information Is Required in the SWPPP?

The permit requires that the SWPPP contain a site description and a description of the measures and controls installed to prevent or minimize pollution of storm water. The components required in the SWPPP include

- ◆ an estimate of the total area of the site and of the area to be disturbed;
- ◆ information on the type of soils at the site and an estimate of the runoff coefficient of the site after construction is complete;
- ◆ the sequence of major construction activities;
- ◆ the name of the receiving water;
- ◆ a list of the sediment and erosion controls and other controls;
- ◆ the timing or staging of the sediment, erosion controls, and storm water management measures;
- ◆ the certification of compliance with Federal, state, and local regulations;
- ◆ the procedures for maintenance and inspection;
- ◆ an inventory of materials used for site operations;

- ◆ a list of procedures for materials management and product-specific spill prevention;
- ◆ certification signatures from an authorized Army representative and contractors; and
- ◆ a site map indicating the drainage patterns and slopes after grading activities are completed, area of soil disturbance, outline of the area to be disturbed, location of stabilization measures and controls, and surface waters at the discharge points. (An example of a site map is found in Appendix B.)

Who Must Sign and Certify the SWPPP?

Specific signatory requirements for the SWPPP are listed in each NPDES storm water permit. Official signatures provide a basis for enforcement action to be taken against the person signing the document. Section 309 of the CWA provides for significant penalties when the permittee provides false information or violates, either knowingly or negligently, the permit requirements. The plan must be signed by a responsible (authorized) official such as the installation commander, USACE district engineer, or the chief of the environmental office. (Signatory requirements are discussed further in Chapter 3.)

How Does the SWPPP Relate to Other Sediment and Erosion Plans for the Site?

The SWPPP is intended to complement, not replace, the site sediment and erosion control plan. Where state and local programs (e.g., sediment and erosion control, storm water management, and site zoning requirements) exist, the operator must certify that the SWPPP reflects, and is in compliance with, all state and local requirements.

BEST MANAGEMENT PRACTICES FOR CONSTRUCTION ACTIVITIES

BMPs are the routine procedures and devices that reduce the amount of pollution in runoff to prevent or minimize pollution of storm water. The U.S. Army Construction Engineering Research Laboratory (USACERL) has published a report entitled, *A Summary of Best Management Practices for Non-Point Source Pollution*, Technical Report EP-93/06 (August 1993), that provides a comprehensive review of current BMPs. Appendix C contains a complete lists (and ordering

information) of the available references that contain the design and cost information for specific BMPs. The following are the three main categories of BMPs:

- ◆ *Erosion and sediment controls.* This category includes both stabilization controls (seeding, mulching, etc.) and structural controls (sediment basins, silt fences, etc.) that prevent soil from migrating off site.
- ◆ *Storm water management controls.* This category includes the measures (such as storm water detention structures, infiltration measures, etc.) that control storm water runoff after the construction is complete.
- ◆ *Other controls (good housekeeping).* This category includes all of the measures taken at the construction site that prevent construction materials from coming into contact with storm water and include dust control measures, off-site vehicle tracking controls, proper waste disposal at the site, and site sanitation.

SUMMARY OF CERTIFICATION REQUIREMENTS

The EPA's general permit for construction activities relies largely on written certifications (signatures) to ensure that responsibilities are explicit. Two types of certifications must be made:

- ◆ *Certification for true, accurate, and complete information.* The NOI, NOT, SWPPP, and inspection reports must include certifications stating that the information presented is true, accurate, and complete. The NOI, NOT, and SWPPP are usually certified and signed by the installation commander, Corps district engineer, or their duly authorized delegate (authorized in writing). The inspection reports are usually signed by the general contractor or site inspector (either a Corps or installation representative). The EPA has the authority to impose various civil and criminal penalties for making false statements in such certifications. In signing the plan, the authorized representative certifies that the information is true and assumes liability for the plan.
- ◆ *Certification for acknowledging the terms and conditions of the general permit.* The contractor and subcontractor must certify that they understand and accept the terms and conditions of the SWPPP.

MONITORING AND INSPECTION REQUIREMENTS

The SWPPP must contain a maintenance and inspection plan that clearly identifies the actions to be taken and the responsible party. Although the Federal EPA's permit does not require sampling of the permitted discharge, some states do require visual or chemical monitoring. See Appendix A for a summary of the state monitoring requirements. The EPA general permit and most state

general permits require that site operators inspect all storm water controls every seven calendar days and within 24 hours after any storm event that produces more than 0.5 inches of rainfall in a 24-hour period. The objective of inspections is to ensure that the permit conditions are being met. Chapter 3 describes the elements of a good maintenance and inspection plan.

Usually, the inspector prepares an inspection report documenting the inspection and findings. The inspector should also be responsible for notifying the responsible parties (contractors) of any required maintenance or repairs. If the SWPPP is updated to allow for site changes or requests from the regulatory agencies, the inspector should make the changes or notify the person responsible for the affected control measure. Appendix D contains a sample inspection and maintenance report form.

NON-STORM-WATER DISCHARGES

The general permit requires non-storm-water discharges to be eliminated prior to the implementation of the SWPPP. However, it may allow for a few specific classes of non-storm-water discharges specified in the general permit. Review the general permit for details.

NOTICE OF TERMINATION REQUIREMENTS

The NOT is a one-page form that must be submitted to the appropriate regulatory authority when a site has been stabilized or when an operator of a construction activity changes. Typically, it includes the location of the construction site, information on the operator terminating coverage, the NPDES general permit number, an indication of why coverage should be terminated for the operator, and a signed certification statement. As defined by the EPA, final stabilization occurs when (1) all the soil-disturbing activities at the site are completed and (2) a uniform perennial vegetative cover with a density of 70 percent of the cover for unpaved areas not covered by permanent structures is established or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) are in place. Appendix D contains a sample NOT.

RECORD-KEEPING REQUIREMENTS

During construction, the permittees (whoever filed the NOI) must keep copies of the SWPPP, NOI, certifications, and inspection reports at the site. Following the termination of construction activities, the permittees (whoever filed the NOI) must keep copies of the SWPPP, NOI, certifications, inspection reports, and the NOT for at least three years from the date of final site stabilization. Furthermore, the EPA has the authority to extend the records retention period, but it must notify the site operator in writing.

PENALTIES FOR NONCOMPLIANCE

The CWA provides significant penalties for failure to comply with the storm water permit requirements. Criminal penalties and civil penalties for negligent violations may be assessed for knowing violations; knowing endangerment; or making false statements on permit applications, inspection reports, or other submittals. The criminal penalties can be up to 15 years in prison or \$25,000 a day per violation.

STATE GENERAL PERMIT REQUIREMENTS

Most states have the authority to issue Federal facilities their own NPDES permits for storm water discharges. Therefore, readers are encouraged to contact state representatives to obtain specific permitting information. Appendix A summarizes the general permit requirements and the state POCs. The following features differ between state and Federal general permits:

- ◆ the expiration date;
- ◆ the requirement to submit a copy of the SWPPP with the NOI for review;
- ◆ the number of days before the start of construction that the NOI must be submitted;
- ◆ the acreage regulated by state permits;
- ◆ the permitting fee;
- ◆ the requirements for inspection and record keeping, which can include different inspection frequencies and different inspector qualifications;
- ◆ the requirement for sampling and monitoring discharges from construction sites;
- ◆ the requirement that a professional engineer certify the SWPPP; and
- ◆ the public notice requirement that in some states mandates that the operator post a notice of construction in a public forum such as a local newspaper.

Appendix A summarizes each state's general permit for storm water discharges from construction activities.

CHAPTER 3

Preparing Storm Water Pollution Prevention Plans for Construction Activities

CHAPTER OBJECTIVES

At the end of this chapter, the reader should understand the elements of an SWPPP and be able to identify appropriate design references. This chapter outlines the steps that must be taken to prepare a basic SWPPP for construction activities or ground-disturbing activities. It is intended only to outline the EPA's requirements for a general permit and not to provide detailed design guidance for preparing complex SWPPPs. USACE Engineering Circular No. 1110-1-80, *Engineering and Design Handbook for the Preparation of Storm Water Pollution Prevention Plans*, provides detailed guidance on preparing and designing more complex SWPPPs.

DEVELOPING AND IMPLEMENTING AN SWPPP FOR INSTALLATION-MANAGED PROJECTS

Under the requirements of the NPDES permit for storm water discharges from construction sites, the EPA and all authorized states require installations to develop and implement SWPPPs for all regulated construction activities. In general, the process of developing an SWPPP for construction activities can be divided into the following six steps:

1. Evaluate the site and develop the site plan.
2. Calculate the storm water runoff for preconstruction and postconstruction sites.
3. Select site controls and complete the site plan.
4. Certify the SWPPP and notify the regulators and the public.
5. Implement controls and start construction.
6. Stabilize the site, notify the regulators, and store the records.

Although contractors or USACE usually develop the site SWPPP, many installations find it cost-effective to prepare basic plans using in-house personnel. The following subsections describe a six-step process that qualified installation personnel can follow to prepare basic SWPPPs for construction sites.

Evaluating the Site and Developing the Site Plan

The first step in preparing an SWPPP for a construction site is to define the characteristics of the site and the type of construction or ground-disturbing activity that will take place. This step is divided into four tasks: collect site information, develop the preliminary site plan, prepare a narrative description of the construction activity, and prepare the SWPPP site map.

COLLECT SITE INFORMATION

It is necessary to collect information about the existing conditions at the site. The EPA's general permit requires that the SWPPP include the following information:

- ◆ *A map of the existing conditions at the site.* That map will be the starting point for the site map required by the SWPPP. Though not required by the general permit, it should be to scale, be topographic, and indicate the existing land use (e.g., wooded area, open grassed area, pavement, and building) as well as the location of surface waters (surface waters include wetlands, streams, rivers, lakes, ponds, etc.). Most installations have complete topographic maps available at their ESO. If not available at the installation, then topographic maps may be available from the USACE district or the U.S. Geological Survey (USGS). USGS maps are the least desirable for use as a site map for an SWPPP because they are only available in a large scale (1:24,000). The scale of the map used in an SWPPP should be small enough to distinguish important features such as drainage swales and control measures.
- ◆ *The types of soils present on the site.* Any available information that describes the soil at a construction site in the SWPPP is helpful. This information should be based on data from the site rather than on regional soil characteristics. The ESO or EO should have this information available from previous reports, soil borings, or general installation records. If no information is available at the installation, check with the Soil Conservation Service for the site's soil information and maps of the area. Also, check if soil borings were conducted for the design of foundations or other structures at the site.
- ◆ *The name of the body or bodies of water that will receive runoff from the construction site.* If the receiving water is a tributary, include the name of the receiving body of water if possible. Receiving waters include creeks, runs, streams, rivers, lakes, wetlands, estuaries, and oceans. If the site drains into a separate municipal storm sewer system, identify the system and indicate

the receiving water to which the municipality discharges. Such information is usually available from installation, county, state, or USGS maps.

- ◆ *Precipitation data for the site.* Precipitation information, often referred to as "design storm," is necessary for the design of storm water management measures. Design storms are typically described in terms of the average amount of time that passes before the same amount of rain falls again and by the duration of the rain event (e.g., the 10-year, 24-hour storm). The state or local storm water program agencies (as listed in Appendix A) can provide the design storm criteria for the specific site. Check with the installation meteorological office to obtain rainfall data. If the installation does not have such an office, other possible sources of rainfall data include the following:
 - ▶ National Weather Service, *Five to 60-Minute Precipitation Frequency for the Eastern and Central United States*, Technical Memorandum NWS HYDRO-35, National Oceanographic and Atmospheric Administration, U.S. Department of Commerce, Maryland, 1977.
 - ▶ National Weather Service, *Rainfall Frequency Atlas of the United States*, Technical Paper No. 40, U.S. Department of Commerce, Washington, D.C., 1961.
 - ▶ National Weather Service, *Two-to-Ten-Day Precipitation for Return Periods of 2 to 100 Years in the Contiguous United States*, Technical Paper No. 49, U.S. Department of Commerce, Washington, D.C., 1964.
- ◆ *Existing runoff water quality.* Collect any information that may be available on the quality of the runoff from the site. The general permit requires that such information, if collected, be included in the SWPPP. In most cases, there will be no water-quality data available from runoff collected specifically from a site. However, in a few cases, water-quality data may have been collected from the site if it is located on or next to an industrial facility or if it drains to a separate municipal storm sewer in a city with a population greater than 100,000. Contact either the installation EO or the municipal storm sewer authority that will receive the storm water from the proposed construction site, and ask whether they have performed any analyses on the storm water from the site.

DEVELOP THE PRELIMINARY SITE PLAN

A preliminary site plan is usually developed for construction activities to assist planners in determining the proper site layout and the general sequence of events. This plan will form the basis of the SWPPP site map. The project/site planner can minimize the ultimate impact to local surface waters near the construction activity by considering the following pollution prevention principles:

- ◆ Disturb the smallest vegetated area possible.

- ◆ Keep the amount of cut and fill to a minimum.
- ◆ Avoid or limit impacts to sensitive areas such as
 - ▶ steep and/or unstable slopes;
 - ▶ surface waters, including wetlands;
 - ▶ areas with erodible soils; and
 - ▶ existing drainage channels.

By meeting these objectives, an installation can reduce pollution in storm water runoff from the site; at the same time, it can reduce construction costs for grading and landscaping, reduce the amount of sediment and storm water management controls, and improve the aesthetics of the completed project.

PREPARE A NARRATIVE DESCRIPTION OF THE CONSTRUCTION ACTIVITY

Develop the preliminary site plan to include a narrative description of the construction activity in the SWPPP. The narrative should provide a brief description of the project, including its purpose, the major soil-disturbing activities that will be necessary to complete the project, and the approximate time it will take to complete the project. When preparing the description, use the following general guidelines:

- ◆ Describe the purpose of the ground-disturbing activity (goal or project result). Examples for military installations include the following: office construction, residential housing development, industrial facility construction, road construction, parking lot, recreational areas, site remediation activities, underground utility, or military training activities.
- ◆ List the soil-disturbing activities, including the following: clearing and grubbing, excavation and stockpiling, rough grading, final area finish grading, preparation for seeding or planting, excavation of trenches, and demolition. The activity descriptions need only address activities that will affect the quality of storm water.

PREPARE AN SWPPP SITE MAP

When the site plan for the construction project is complete, this information should be transferred onto the SWPPP site map. Usually, the construction site plan and the SWPPP site map are the same. Along with the location and identity of the surface waters, the map must show the following:

- ◆ *Slopes after grading on the same map as the existing grades.* Display the information as dashed lines for existing topographic contours and solid lines for

proposed topographic contours. A map containing both existing and proposed contours clearly shows the areas that must be disturbed for regrading. If the site map does not contain detailed topographic information, examine the site plan and indicate the approximate location, direction, and steepness of slopes on the site map. You may use arrows (pointing from high to low) to indicate the location and direction of the slope. Indicate what the steepness of slopes will be after grading. Slope steepness is usually expressed as a ratio of the length (in feet) required to decrease one foot in height (e.g., 2:1 indicates that it takes two feet horizontally for the slope to drop one foot vertically).

- ◆ *Entire area that will be disturbed by the construction activity.* Indicate where the soil-disturbing activities will take place by drawing a "limit of disturbance" line on the site plan. The limit of disturbance line should be a closed boundary around the entire disturbed area so that any soil-disturbing activity will occur inside the area formed by the line. Include roads for construction vehicles unless those roads are paved (or stabilized) and have measures to reduce tracking of sediments. When designating the area on the map, leave room for the control structures. Also, designate any undisturbed areas located inside the limit of disturbance.
- ◆ *Drainage patterns after the major grading activities, including the location of the discharge points on the site map.* Designate drainage boundary features on the site map. If possible, use a topographic site map that indicates drainage basin boundaries and drainage pipes. A drainage basin is an area of the site in which water drains to a common outlet such as a storm drain pipe. Draw the drainage boundaries as closed lines that start and end at the common outlet. Typically the line will follow the high points to enclose an area that drains to the outlet. A site can have one or more drainage basins. The site map should indicate the drainage boundaries after the major grading has occurred or structural controls have been installed. If a topographic site map is not available, use arrows to indicate the direction in which water will flow. Show the overland flow areas and the location of swales or channels. Show any new or proposed underground storm drain system on the site, including the diameter of the pipe, its slope, and discharge location.
- ◆ *Runoff controls and soil stabilization.* The goal of preparing the SWPPP is to control runoff. Therefore, the map is not complete until it includes the locations of the major control structures and the major stabilization areas.

Calculating the Storm Water Runoff for Preconstruction and Postconstruction

After identifying the characteristics of the site, the next step in developing an SWPPP is to calculate the final runoff coefficient from the site. The general permit requires that this coefficient be calculated for the site conditions after the construction activity occurs. This coefficient represents the amount of storm water that becomes runoff for a particular land surface. Site engineers also will use

it to estimate the quantity of storm water runoff from the site and to select the site controls. The steps that should be followed to estimate the storm water runoff from a site include the following:

- ◆ Measure the total and disturbed areas of the construction site.
- ◆ Measure the area of the drainage basin that drains through the site.
- ◆ Calculate the runoff coefficients on the basis of the site conditions before and after the construction.
- ◆ Estimate the quantity of storm water runoff (site engineer should complete).

MEASURE THE CONSTRUCTION SITE AREA

The SWPPP must include estimates of the total site area and the total disturbed area. The total area of the site usually is listed on the project site plan. Include the entire area inside the project's property boundaries, easements, and rights of way. Remember that the total area includes both the disturbed and undisturbed areas.

Next, measure the area that will be disturbed by the construction activity. The net disturbed area is often noted on the construction site plan or the grading plan. It equals the area enclosed by the limit of disturbance line drawn on the site map minus any undisturbed areas within the limit of disturbance. Express the area information in acres rounded to the nearest tenth of an acre (such as 16.5 acres of total site area and 5.4 acres of disturbed area).

If this information is not already noted on the site maps, it can be calculated using various methods. The most accurate method of measuring it from the site map is with a planimeter or digitizer. A planimeter is a device that can measure the area on a drawing by tracing its outline. Planimeters are available from engineering and surveyor supply stores. A digitizer is an electronic device that can be used to trace the outline of a shape on a drawing and transfer the coordinates of the shape to a computer, where a program (such as a computer-aided design program) can compute the enclosed area.

One method that provides a good estimate of the site area is the grid method. This method requires only a transparent graph or grid paper and requires the following steps:

1. Place the graph or grid paper over the scale drawing and trace the outline of the entire property.
2. Count the total number of complete squares within the site area; count every two partial squares along the edges of the site as one square.

3. To determine the area of the site in units of square inches, divide the total number of squares by the number of squares in one square inch of grid paper.
4. To obtain the estimate in units of square feet, multiply the result of step 3 by the number of square feet in a one-inch square based on the scale of the drawing.
5. Divide the number of square feet on the site by 43,560. The result is an estimate of the site area in acres. (Repeat this method using the outline of the disturbed area to find the estimated acreage of soil-disturbing activities.)

MEASURE THE DRAINAGE BASINS

Measure the area of each drainage basin in the construction site. Although the SWPPP does not list the size of each drainage area, site planners need that information to design the specific controls for that basin (e.g., retention ponds, sediment controls, and storm water runoff controls). Use one of the methods suggested previously to measure the area of each land use in the drainage basins. The EPA general permit requires the use of a temporary or permanent sediment basin in any location at which more than 10 acres are disturbed at one time. The sediment basin must provide at least 3,600 cubic feet of storage for every acre of land that it drains (flows from upland areas that are undisturbed may be diverted around the basin).

CALCULATE THE RUNOFF COEFFICIENT

The next step in the assessment phase is to estimate the runoff coefficient for the final site conditions and to record it on the NOI. The runoff coefficient (C) represents the amount of the total rainfall that becomes runoff. Table 3-1 lists the different types of land uses and the associated runoff coefficient.

The less rainfall absorbed (infiltrated) into the ground, evaporated, or otherwise absorbed on site, the higher the C value. For example, the C value of a lawn area is 0.2, which means that only 20 percent of the rainfall landing on that area will run off, the rest will be absorbed or evaporate. A paved parking area would have a C value of 0.9, which means that 90 percent of the rainfall landing on that area will run off. The C value calculated for the SWPPP is the one that represents the condition of the site after construction is completed.

To determine the runoff coefficients for sites with more than one land use, calculate a weighted average on the basis of the area of the runoff coefficients for each land use. A formula used to determine the weighted C is as follows

$$\bar{C} = \frac{A_1C_1 + A_2C_2 + \dots A_xC_x}{A_1 + A_2 + \dots A_x}, \quad [\text{Eq. 3-1}]$$

Table 3-1.
Runoff Coefficients for Various Land Uses

Land use description	Runoff coefficients
Business	
Downtown areas	0.70 – 0.95
Neighborhood areas	0.50 – 0.70
Residential	
Single-family areas	0.30 – 0.50
Multi units, detached	0.40 – 0.60
Multi units, attached	0.60 – 0.75
Residential (suburban)	0.25 – 0.40
Apartment dwelling areas	0.50 – 0.70
Industrial	
Light areas	0.50 – 0.80
Heavy areas	0.60 – 0.90
Parks, cemeteries	0.10 – 0.25
Playgrounds	0.20 – 0.40
Railroad yard areas	0.20 – 0.35
Unimproved areas	0.10 – 0.30
Streets	
Asphalt	0.70 – 0.95
Concrete	0.80 – 0.95
Brick	0.70 – 0.85
Drives and walks	0.75 – 0.85
Roofs	0.75 – 0.95
Lawns — coarse-textured soil (greater than 85 percent sand)	
Slope: Flat, 2 percent	0.05 – 0.10
Average: 2 to 7 percent	0.10 – 0.15
Steep: 7 percent	0.15 – 0.20
Lawns — fine-textured soil (greater than 40 percent clay)	
Slope: Flat, 2 percent	0.13 – 0.17
Average: 2 to 7 percent	0.18 – 0.22
Steep: 7 percent	0.25 – 0.35

Source: "Design and Construction of Sanitary and Storm Sewers," *American Society of Civil Engineers Manual of Practices*, 1960.

where

\bar{C} = weighted C value for the site,

A = area in acres of each major land surface type,

C = existing runoff coefficient for each major land surface type, and

x = number of different land surface types.

Example calculation:

An unimproved lot containing 20 acres will be converted into an apartment complex. The final site will contain 6 acres of apartment dwellings, 4 acres of paved areas, and 10 acres of unimproved areas. Therefore, using the average values from Table 3-1, the weighted C for the final site is calculated as follows:

$$\bar{C} = \frac{(6)(0.6) + (4)(0.8) + (10)(0.2)}{6 + 4 + 10} = 0.44.$$

ESTIMATE THE QUANTITY OF STORM WATER RUNOFF

One method used for calculating the flow rate of storm water runoff is the "rational method," which uses the formula:

$$Q = C \times I \times A, \quad [\text{Eq. 3-2}]$$

where

Q = the rate of runoff from an area (cubic feet per second),

I = rainfall intensity (inches per hour), and

A = area of the drainage basin (acres).

Many methods can be used to estimate the amount of runoff from a site. The EPA does not require the use of the rational method to design storm water conveyances or management measures. However, state or local design guides may describe specific methods for estimating design flow rates from each construction activity on the basis of its size.

Selecting Site Controls and Completing the SWPPP

After estimating the storm water runoff from the site, the site engineer (a contractor, USACE district engineer, or installation engineer) will select and design the site controls. When selecting the controls, the site engineer should follow these steps:

- ◆ Review and incorporate state and local requirements.
- ◆ Select both the temporary and permanent erosion and sediment controls.
- ◆ Select other, nonstructural pollution prevention measures.
- ◆ Indicate location of controls on the site map.
- ◆ Prepare an inspection and maintenance plan.
- ◆ Prepare a description of controls.
- ◆ Prepare the sequence of major events.

The following subsections expand on each of these steps. However, this information is only intended to provide a general overview of the steps involved in selecting site controls. It is not to be used as a design reference. Ensure that the site controls are selected and designed by a qualified engineer familiar with the EPA's general permit requirements and the Engineering Circular No. 1110-1-80, *Engineering and Design Handbook for the Preparation of Storm Water Pollution Prevention Plans*, prepared by the USACE.

REVIEW AND INCORPORATE STATE AND LOCAL REQUIREMENTS

Many states and local authorities have sediment and erosion control or storm water management regulations in place. The NPDES storm water permit is not intended to supersede state or local requirements. Instead, it ensures that site operators provide a minimum level of pollution prevention. Furthermore, the EPA general permit specifically instructs all permittees to meet state and local requirements.

Consult state or local authorities to determine what, if any, requirements exist for sediment and erosion control on construction projects. Many states and local authorities provide their own design manuals or guidance to assist in preparing a plan that meets their requirements. If the state or local authority requires review and approval of the sediment and erosion control plan, attach an approved copy of that plan with the SWPPP. Appendix A lists the state POCs for construction issues.

Although many of the provisions of the Federal EPA's NPDES storm water permits for construction activities are consistent with most state and local

requirements, differences may exist in the specific requirements for control measures. When a difference occurs in EPA, state, and local requirements, follow the more stringent requirement.

SELECT THE TEMPORARY AND PERMANENT EROSION AND SEDIMENT CONTROLS

The SWPPP must include a description of both the temporary and permanent control measures. The site engineer must describe the temporary or permanent soil erosion and sediment control practices in the SWPPP. When selecting the control measures, incorporate the following objectives:

- ◆ *Stabilize the soil.* Minimize the amount of disturbed soil, using stabilization practices such as permanent seeding, sod stabilization, geotextile stabilization, reinforced soil-retaining systems, or gabions. Under the Federal EPA's general permit, disturbed areas of the construction site that will not be re-disturbed for 21 days or more must be stabilized by the 14th day after the last disturbance. The permit also requires the installation of silt fabric fences for all slope and down-slope site boundaries. However, no other structural practices are required for a site of less than 10 acres if a sediment basin with a volume of 3,600 cubic feet per acre of drainage area is provided.
- ◆ *Dissipate flow velocity.* Minimize the runoff flow across the site using measures such as check dams and surface roughening. The EPA general permit requires this for all regulated construction activities.
- ◆ *Manage storm water.* Prevent runoff from off-site areas from flowing across disturbed areas, using measures such as earth dike, drainage swales, and pipe slope drains.
- ◆ *Capture sediment.* Remove sediment from on-site runoff before it leaves the site, using measures such as silt fences, straw bale barriers, sediment traps, storm drain-inlet protection, and brush barriers.

Temporary Site Controls

Temporary site controls are only in place during the construction activity. The selection of the most appropriate temporary site controls is dependent on the nature of the construction activity and the characteristics of the site. An excellent reference is Technical Report EP-93/06, *A Summary of Best Management Practices for Non-Point Source Pollution*, prepared by the U.S. Army Construction Engineering Research Laboratory (USACERL). Another excellent reference is the Engineering Circular No. 1110-1-80. Appendix C of this document provides additional references and ordering information.

Permanent Site Controls

Permanent storm water management controls are constructed and left in place to control pollution of storm water after the construction is completed. Very little specific guidance is available from the EPA as to what will meet the requirements for storm water management controls. They may be the same as the temporary erosion and sediment control measures. In addition to erosion control, many state and local regulations require that the permanent controls restrict the postconstruction runoff rate to the preconstruction flow rate for a given design storm. If no local guidance is available on the type of permanent storm water management controls, refer to the USACE and USACERL documents for BMP guidance and design criteria. Generally, permanent controls include

- ◆ storm water detention structures (including wet ponds);
- ◆ storm water retention structures;
- ◆ open vegetated swales;
- ◆ natural depressions;
- ◆ infiltration measures; and
- ◆ velocity dissipation measures, such as outlet protection.

SELECT OTHER POLLUTION PREVENTION MEASURES

The SWPPP must include information about "good housekeeping and sanitation" controls for other potential pollutant sources that may exist on a particular construction site. Pollutants, other than soil, that may enter the storm water from construction sites include

- ◆ fuel oils, such as gasoline, diesel oil, hydraulic fluid, motor lubricants, and coolants;
- ◆ paints, solvents, detergents, and sealants;
- ◆ construction litter and debris; and
- ◆ fertilizers and pesticides.

The SWPPP should list all pollutants to be used at the site that have a reasonable potential to contaminate storm water runoff. Site planners can use this list as a guide to designate areas for equipment maintenance, provide for storage of chemicals, plan for adequate waste receptacles, and schedule routine waste collection.

INDICATE THE LOCATION OF CONTROLS ON THE SITE MAP

Indicate the location of each measure used for erosion and sediment control and storm water management on the site map. Good housekeeping and sanitation controls, however, do not have to be shown on the site map. After indicating the controls on the site map, check the initial limit of disturbance and/or the drainage boundaries to see if they need to be revised. Diversion structures often change the drainage boundaries by diverting runoff from one drainage basin to another. Therefore, the drainage patterns on the SWPPP site map must reflect the final site drainage patterns. The final SWPPP site map must show

- ◆ drainage patterns,
- ◆ approximate slopes after grading,
- ◆ areas of soil disturbance,
- ◆ location of major structural and nonstructural controls, and
- ◆ location of surface waters.

PREPARE AN INSPECTION AND MAINTENANCE PLAN

The general permit requires that an operator prepare a description of the procedures in place to maintain the pollution prevention measures on site. These controls must be in good operating condition until the area they protect has been completely stabilized or the construction project is completed. The EPA's general permit requires that operators (or qualified individuals) inspect the controls once every seven days and within 24 hours after a rainfall with an intensity greater than 0.5 inches. Appendix A summarizes the difference in inspection requirements between Federal and state permits. (Note: Some states have specific definitions of what qualifies a person to inspect the site controls [e.g., Michigan].) A good inspection plan should address

- ◆ areas to be inspected and maintained,
- ◆ control measures to be inspected and maintained,
- ◆ inspection schedule,
- ◆ maintenance procedures,
- ◆ inspection and maintenance forms,
- ◆ names of inspectors (or titles), and
- ◆ inspector qualifications.

Prepare an inspection and maintenance checklist that addresses each of the control measures proposed for the facility. Include blank copies of the checklist in the SWPPP and make it available on site. The inspector should complete a copy of a new checklist during each inspection. Consult state or local manuals for specific maintenance requirements. Appendix D contains sample checklists for the inspection and maintenance required by the SWPPP.

DESCRIBE CONTROLS

After planning the construction activities and selecting the controls, prepare a list of each type of control planned for the site. Include in that list a description of each control, its purpose, and why it is appropriate in this location. The description should also include specific design information such as size, retention capacity, materials, and methods of construction.

DESCRIBE THE SEQUENCE OF MAJOR ACTIVITIES

Prepare a brief description of major activities required in the construction of control measures, soil-disturbing activities, and maintenance activities for control measures. List these activities in the order in which they will occur. Specific timing requirements for installation and maintenance of control measures will depend upon the construction activities. However, consider several general principles when developing the sequence of major activities:

- ◆ Install down-slope and side-slope perimeter controls before starting a land-disturbing activity.
- ◆ Disturb the smallest area possible and only when necessary to proceed with construction.
- ◆ Cover or stabilize disturbed land as soon as possible.
- ◆ Time activities to limit the effect of seasonal climate changes or weather events.
- ◆ Delay construction of infiltration measures to the end of the construction project when upstream drainage areas have been stabilized.
- ◆ Do not remove temporary perimeter controls until after all upstream areas are stabilized.

Certifying the SWPPP and Notifying the Regulators and Public

The installation (or Corps district) must certify the SWPPP and submit an NOI to the appropriate agencies once they have completed the site description and control sections. The checklist provided in Appendix D can be useful in

evaluating whether all the required items are included in the construction SWPPP prior to certifying the plan or submitting an NOI.

CERTIFY THE SWPPP

The EPA's general permit requires that an authorized representative of each operator sign and certify the plan to ensure that the SWPPP is completely developed and adequately implemented. The representative should be at or near the top of the chain of command, such as an installation commander, USACE district engineer, or someone who has been delegated the authority to sign and certify this type of document (Chief, installation engineer, or project officer). In signing the plan, the authorized representative certifies that the information is accurate and assumes liability for the plan.

Typically, construction contractors or subcontractors are responsible for implementing the controls specified in the plan but may not have the authority to design or modify the plan. Many NPDES permits require that those contractors certify that they understand the requirements of the permit and the plan and will implement the measures for which they are responsible. Appendix D contains a sample contractor's certification letter.

SUBMIT THE NOTICE OF INTENT

The EPA's general permit for storm water discharges from construction activities requires that an operator (either the installation engineer or Corp district engineer) submit an NOI at least two days prior to beginning construction. Since state permits have different requirements, consult the permit (summarized in Appendix A) to determine the exact deadline for submitting an NOI. The site operator must complete the SWPPP before submitting the NOI. In cases in which more than one party meets the definition of an "operator" of a construction activity, all those parties may need to submit an NOI and become copermitees.

SUBMIT THE SWPPP FOR REGULATORY REVIEW

Some state NPDES storm water permits for construction activities require the site operator to submit the SWPPPs to the regulators for review. However, the EPA general permit merely requires that plans be maintained on site. Permitting authorities may prefer not to receive the permits in order to reduce the administrative burden of reviewing a large number of SWPPPs. Appendix A contains a list of the states that require the SWPPP with the NOI.

The EPA also reserves the right to review the SWPPP. When the EPA requests the SWPPP, permittees should submit it in a timely manner. When requested, they should also submit their plan to state or local sediment and erosion or storm water management agencies or to a municipal operator when

the site discharges water through an NPDES storm water permitted separate municipal storm sewer system. Examine each permit carefully to determine the requirements for submitting plans the facility must follow.

Implementing Controls and Starting Construction

MAINTAIN THE SWPPP AT THE SITE

The EPA's general permit requires that a copy of the SWPPP be kept at the construction site from the time construction begins until the site is finally stabilized. Both the general contractor and the installation should maintain a copy of the SWPPP since it may be modified during the construction activity. Notify the site operator of any changes and update the SWPPP.

While maintaining the SWPPP on site, compile all records and supporting documents in an orderly fashion since EPA's general permit requires that all records be stored for three years after project completion. This provision ensures that all records will be available in case a legal situation arises for which documentation is necessary. Refer back to the record-keeping discussion in Chapter 2 of this report.

IMPLEMENT CONTROLS

After completing the SWPPP and submitting the NOI, the site operator can begin construction activities. However, the operator is now obligated to implement the contents of the SWPPP.

The first step is to construct or apply the specific control measures in accordance with state or local specifications. If state or local specifications for control measures do not exist, construct the controls according to USACE Engineering Circular No. 1110-1-80. This document lists typical design standards for structural control measures.

Construct the control measures and apply the stabilization measures in the order indicated in the sequence of major activities. Ensure that work crews who install the measures are trained to install and implement site controls correctly. Improperly installed controls can have little or no effect and may increase the rate of erosion. All other workers on the construction site should be made aware of the controls so that they do not inadvertently disturb or remove them.

INSPECT AND MAINTAIN CONTROLS

Inspection and maintenance of the control measures are actions that are as important to pollution prevention as proper planning and design. Site operators (or designated inspectors) must inspect the control measures at the frequency specified in the SWPPP or the permit. EPA's general permit requires an

inspection every seven days or within 24 hours of a storm with an intensity of 0.5 inches or greater in a 24-hour period. Operators must inspect all disturbed areas of the site, areas for material storage, locations at which vehicles enter and exit the site, and all the erosion and sediment controls.

The inspector should look at each measure to determine whether it is still effective based on the description included in the SWPPP. USACE provides sample checklists for specific BMPs in Engineering Circular No. 1110-1-80. The inspector should look for three basic things when inspecting a pollution prevention measure:

- ◆ Whether the measure was installed properly
- ◆ Whether the measure has been damaged since it was installed
- ◆ What steps are necessary to correct any problems with the measure.

The inspector must record any damages or deficiencies in the control measures on the inspection report form provided for that purpose (Appendix D contains sample report forms). These reports document the inspection of pollution prevention measures. The operator should correct damage or deficiencies as soon as practicable after the inspection but certainly in less than seven days after inspection. States have specific criteria for inspections, inspector qualifications, and the frequency for conducting inspections. Appendix A contains a summary of the state inspection requirements.

MAINTAIN A RECORD OF CONSTRUCTION ACTIVITIES

Although not required by the general permit, the site operator should maintain a record of the major site activities. This should include the dates when major grading occurs in a particular area, the dates when activities cease in an area, and the date when an area is stabilized.

UPDATE AND CHANGE THE PLAN

Update and change the SWPPP so that it accurately reflects any changes that occur during the construction process. If, at any time during the effective period of the permit, the permitting authority finds that the SWPPP does not meet minimum standards or accurately reflect the construction activity, it will notify the permittees of required changes needed to bring it up to standard.

REPORT RELEASES OF REPORTABLE QUANTITIES

Construction activities may handle certain hazardous substances in amounts that equal or exceed reportable quantity (RQ) levels. The RQ levels and the associated regulations can be found in 40 CFR Parts 110, 117, and 302.

Besides these regulations, the installation spill contingency plan (ISCP) contains required response actions, site POCs, and phone numbers.

PROVIDE PUBLIC ACCESS TO THE SWPPP

The SWPPP and related documents are considered to be reports in accordance with Section 308(b) of the CWA, though permittees may not have to submit them to EPA or any other regulatory agency. Under the Freedom of Information Act, site operators must make them available for public review.

Stabilizing the Site, Notifying the Regulators, and Storing Records

The NPDES permit remains in effect as long as there exists a storm water discharge associated with construction activity. The need for a permit may end because the storm water discharge is eliminated; but, more commonly, the need for a permit ends when the construction and final stabilization are completed. Final stabilization requirements vary from permit to permit.

When storm water discharges associated with a construction activity cease, the owner/operator of the facility must cease permit coverage by submitting an NOT. The EPA requires site operators to retain copies of the SWPPP and all other reports (including the NOI) for three years after final site stabilization.

STABILIZE THE SITE

After completing construction activities, the site operator must stabilize the site according to the SWPPP. Final site stabilization is defined by the EPA's general permit as completion of all soil-disturbing activities at the site and the establishment of a uniform perennial vegetative cover with a density of 70 percent of the cover for unpaved areas not covered by permanent structures, or the employment of equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles).

PREPARE AND SEND NOTICE OF TERMINATION

Once the site is stabilized or the site operator has changed, the installation must submit an NOT to the appropriate agency. Information required in the NOT includes the location of the construction site; the name, address, and telephone number of the operator terminating coverage; the NPDES general permit number; an indication of why coverage under the permit should be terminated for the operator; and a signed certification statement. When a change in operators (i.e., general contractors) occurs at a construction activity, EPA requires the new operator to submit an NOI at least two days before the change. Appendix D contains a sample NOT letter.

STORE THE RECORDS

The installation will have to maintain records for each permitted activity for three years after the NOT submission date. Therefore, ensure that the site coordinator (contractor or Corp district engineer) submits a final copy of the site records as detailed in Chapter 1 of this document. For organization purposes, maintain the records in a binder and note on the spine of the binder the NPDES permit number, construction activity title, and the construction dates. This will facilitate data storage and data retrieval.

APPENDIX A

Summary of State and Federal General
Permits for Storm Water Discharges
Associated with Construction
Activity — 1996

Table A-1.
Summary of State and Federal General Permits for Storm Water Discharges Associated with Construction Activity — 1996

State	Expiration date	Who has Federal facility authority?	Installation required to submit SWPPP with NOI?	No. of days prior to construction NOI due?	Permit covered area (acres)	Permit fee	Site inspection schedule	Are samples required?	Public notice required?	SWPPP P.E. Cert.	POC name and telephone number
EPA-GEN	10/01/97	EPA	No	2	5	No	1WK-24RF ¹	No	No	No	See each state for POC information
AL	07/31/97	AL	No	30	5	\$200	2WK-48RF ²	Yes	Yes	No	Richard Hulcher, (205) 271-7782
AK	10/01/97	EPA-10	No	2	5	No	1WK-24RF	No	No	No	Joe Wallace, (206) 553-8399
AZ	10/01/97	EPA-9	No	2	5	No	1WK-24RF	No	No	No	Eugene Bromley, (415) 744-1906
AR	09/30/97	AR	No	2	5	\$100	1WK-24RF	No	Yes	No	Lisa Farmer, (501) 562-7444
CA	08/20/97	CA ³	No	0	5	\$500	2WK-24RF	No	No	No	Archie Matthews, (916) 657-1110
CO	03/31/95	EPA-8	No	10	5	\$250	2WK-24RF	No	No	No	Bob Shankland, (303) 293-1597
CT	10/01/97	CT	No	15	5	\$150	1WK-24RF	No	No	Yes	Vern Berry, (303) 293-1630 Christopher Stone, (203) 566-7167
DC	10/01/97	EPA-3	No	2	5	No	1WK-24RF	No	No	No	Kevin Mager, (215) 597-1651
DE	10/01/97	EPA-3	No	2	5	No	1WK-24RF	No	No	No	Charles Schandel, (302) 739-5731 or (215) 597-1651
FL	10/01/97	EPA-4	No	2	5	No	1WK-24RF	No	No	No	Roosevelt Childress, (404) 347-3012, ext. 2980

Note: Cert. = certification; EPA = Environmental Protection Agency; EPA-GEN = requirements for the U.S. EPA general permit for storm water discharges from construction sites; NOI = notice on intent; P.E. = professional engineer; POC = point of contact; RF = rainfall; SWPPP = Storm Water Pollution Prevention Plan; WK = week.

¹ Inspect site of least once every 7 days and within 24 hours after a rainfall with an intensity greater than 0.5 inches.

² Inspect site of least once every 14 days and within 48 hours after a rainfall with an intensity greater than 0.75 inches.

³ Individual California State Water Boards may have different requirements.

Table A-1.
Summary of State and Federal General Permits for Storm Water Discharges Associated with Construction Activity — 1996 (Continued)

State	Expiration date	Who has Federal facility authority?	Installation required to submit SWPPP with NOI?	No. of days prior to construction NOI due?	Permit covered area (acres)	Permit fee	Site inspection schedule	Are samples required?	Public notice required?	SWPPP P.E. Cert.	POC name and telephone number
GA	11/18/97	GA	No	2 ¹	5	No	1WK-24RF	No	No	No	Will Salter/Larence Hedges, (404) 656-4887
HI	11/01/97	HI	Yes	90	5	No	1WK-24RF	Yes ²	Yes	Yes	Mark Tomomitsu, (808) 586-4309
ID	10/01/97	EPA-10	No	2	5	No	1WK-24RF	No	No	No	Joe Wallace, (206) 553-8399
IL	09/30/97	IL	No	2	5	No	1WK-24RF	No	Yes	No	Sue Epperson, (217) 782-0610
IN	By rule	IN	No ³	0 ⁴	5	\$50	No	No	Yes	No	Laura Bieberick, (317) 233-6725
IA	10/01/97	IA	No	1	5	\$250 — \$500 ⁵	1WK-24RF	No	Yes	No	Monica Wnuk, (515) 281-7017
KS	Form letter ⁶	KS	Yes	30	5	No ⁷	1WK-24RF	No	Yes	No	Marion Massoth, (913) 296-5556
KY	09/30/97	KY	No	2	5	No	1WK-24RF	No	No	No	Don Carlson, (913) 296-5547
LA	10/01/97	EPA-6	No	2	5	No	1WK-24RF	No	No	No	Doug Allgeier/Jeff Hippe, (502) 564-3410, ext. 464 Paulette Johnsey, (214) 655-7185

Note: Cert. = certification; EPA = Environmental Protection Agency; EPA-GEN = requirements for the U.S. EPA general permit for storm water discharges from construction sites; NOI = notice of intent; P.E. = professional engineer; POC = point of contact; RF = rainfall; SWPPP = Storm Water Pollution Prevention Plan; WK = week.

¹ NOIs must also be submitted to local soil conservation offices. If an erosion and sediment control plan has already been approved, no separate SWPPP is required.

² Record duration and intensity of storm event to estimate runoff.

³ Indiana requires an individual permit for discharges into certain high-quality waters of the state and a 90-day notice.

⁴ Same as above.

⁵ Iowa requires \$100 application fee per permit. One of two payment options are available: \$450 for 5 years or \$150 per year for 2 years or less.

⁶ Kansas uses a form letter that asks certain questions.

⁷ A general permit will be developed some time in the summer of 1996. It will be a five-year permit with an associated fee.

Table A-1.
Summary of State and Federal General Permits for Storm Water Discharges Associated with Construction Activity — 1996 (Continued)

State	Expiration date	Who has Federal facility authority?	Installation required to submit SWPPP with NOI?	No. of days prior to construction NOI due?	Permit covered area (acres)	Permit fee	Site inspection schedule	Are samples required?	Public notice required?	SWPPP P.E. Cert.	POC name and telephone number
ME	10/01/97	EPA-1	No	2	5	No	1WK-24RF	No	No	No	Clyde Shuself, (617) 565-3580
MD	10/01/97	MD	No	2	5	No	1WK-24RF	No	No	No	Lois MacNamara, (410) 631-3543
MI	11/13/97	MI	No	0	5 ¹	\$125	1WK-24RF ²	No	No	No	Claine Lennon, (410) 631-3323
MN	09/30/97	MN	No	2	5	No	1WK-24RF	No	No	No	Gary Scheuren, (517) 373-1326
MS	07/13/97	MS	No	30	5	No	1WK-24RF ³	No	No	No	Dan Sullivan, (612) 296-7219
MO	5 years	MO	No	0	5	\$150	No	Yes ⁵	No	No	Scott Thompson, (612) 296-7203
MT	11/30/94	MT	Yes	30	5 ⁶	\$400 ⁷	1WK-24RF	No	No	No	Louis Lavallee, (601) 961-5074
NE	05/26/97	NE	No	0 ⁸	5	No	1WK-24RF	No	No	No	Linda Vogt, (314) 526-5630
NV	05/14/98	NV	Yes	2	5	\$200	No	No	No	No	Richard Laux, (314) 751-6982
											Karen Anthony, (406) 444-2477
											David Ihire, (402) 471-4239
											Rob Sanders, (702) 687-4670, ext. 3149

Note: Cert. = certification; EPA = Environmental Protection Agency; EPA-GEN = requirements for the U.S. EPA general permit for storm water discharges from construction sites; NOI = notice on intent; P.E. = professional engineer; POC = point of contact; RF = rainfall; SWPPP = Storm Water Pollution Prevention Plan; WK = week.

¹ Michigan requires that regulated construction activities obtain an Act 347 permit.

² Michigan requires that inspectors be certified storm water operators.

³ Inspect site within 24 hours of a storm event with a six-inch intensity on the Gulf Coast and a four-inch intensity at the Tennessee border.

⁴ Missouri requires a written erosion control plan for an area over 10 acres.

⁵ Missouri requires that settleable solids be monitored quarterly.

⁶ Permit is required for construction activities greater than 1 acre if the site is 100 feet from state waters.

⁷ A \$400 one-time application fee plus a \$400 annual renewal fee.

⁸ Nebraska is currently revising this. Check with the state for status.

Table A-1.
Summary of State and Federal General Permits for Storm Water Discharges Associated with Construction Activity — 1996 (Continued)

State	Expiration date	Who has Federal facility authority?	Installation required to submit SWPPP with NOI?	No. of days prior to construction NOI due?	Permit covered area (acres)	Permit fee	Site inspection schedule	Are samples required?	Public notice required?	SWPPP P.E. Cert.	POC name and telephone number
NH	10/01/97	EPA-1	No	2	5	No	1WK-24RF	No	No	No	Clyde Shuself, (617) 565-3580
NJ	11/01/97	NJ	No	30	5	\$200	Annually	No	Yes	No	Ed Franco, (609) 633-7021
NM	10/01/97	EPA-6	No	2	5	No	1WK-24RF	No	No	No	Brent Larsen, (214) 655-7185
NY	08/01/98	NY	No	2	5	No	1WK-24RF	No	No	No	Ken Stevens, (518) 457-3656
NC	08/31/97	NC	Yes	0	5	\$50	1WK-24RF	No	No	No	Steve Ulmar, (919) 733-5083
ND	09/30/94	ND	Yes	5	All	No	1WK-24RF	Yes ¹	No	No	Jim Collins, (701) 221-5210
OH	04/26/94 ²	OH	No	45	5	\$100	1WK-24RF	No	No	No	Mohammed Islam, (614) 644-2008
OK	10/01/97	EPA-6	No	2	5	No	1WK-24RF	No	No	No	Wren Stenger/Brent Larsen (214) 655-7185
OR	09/30/96	OR	Yes ³	90	5	\$300	1WK-24RF	No	No	No	Keith Anderson, (503) 229-5876
PA	10/01/97	PA	Yes	45	5	\$100	1WK-24RF	No	No	No	Ken Yuran/Mike Sherman, (717) 783-7577
RI	03/19/98	RI	Yes	30	5	\$462	1WK-24RF ⁵	No	No	No	Kim Wiegand, (401) 277-6519
SC	09/30/97	SC	No	2	5	No	1WK-24RF	No	No	No	Arturo Ovalles, (803) 734-5269

Note: Cert. = certification; EPA = Environmental Protection Agency; EPA-GEN = requirements for the U.S. EPA general permit for storm water discharges from construction sites; NOI = notice of intent; P.E. = professional engineer; POC = point of contact; RF = rainfall; SWPPP = Storm Water Pollution Prevention Plan; WK = week.

¹ Record duration and intensity of storm event to estimate runoff.

² Ohio expects to reissue permit in the summer of 1996. The current permit will be effective until the new permit is issued.

³ SWPPP is due 30 days prior to construction.

⁴ General permit does not cover construction activities disturbing greater than 25 acres. The general permit is required to obtain an soil-disturbance permit for any construction activity discharging into special protection waters or any construction activity with excavations that are greater than 25 feet below ground level.

⁵ Inspect site within 24 hours of a storm event with an intensity of 0.25 inches or greater.

Table A-1.

Summary of State and Federal General Permits for Storm Water Discharges Associated with Construction Activity — 1996 (Continued)

State	Expiration date	Who has Federal facility authority?	Installation required to submit SWPPP with NOI?	No. of days prior to construction NOI due?	Permit covered area (acres)	Permit fee	Site inspection schedule	Are samples required?	Public notice required?	SWPPP P.E. Cert.	POC name and telephone number
SD	10/01/97	EPA-8	No	2	5	No	1WK-24RF	No	No	No	Vern Barry, (303) 293-1647
TN	10/01/97	TN	No	15	5	No	1WK-24RF	Yes ¹	No	No	Tom Roehm, (615) 532-0671/0625
TX	10/01/97	EPA-6	No	2	5	No	1WK-24RF	No	No	No	Wren Stenger/Brent Larsen, (214) 655-7185
UT	09/30/97	UT	No	2	5	\$270	1WK-24RF	No	No	No	Marck Schmidt, (801) 538-6146
VT	10/01/97	EPA-1	No	2	5	No	1WK-24RF	No	No	No	Todd Sternbach, (802) 241-3822
VA	09/22/97	VA	No	14	5	\$200 ²	1WK-24RF	No	No	No	Bert Tuxford, (804) 527-5083
WA	09/09/97	EPA-10	No	2	5	No	1WK-24RF	No	No	No	Kathy Collins, (206) 553-2108
WV	06/07/97	WV	Yes	30	3 ³	\$350 — \$875 ⁴	1WK-24RF	No	No	No	Lyle Bennett, (304) 558-2108
WI	Draft	WI	No	14	5	\$200	1WK-24RF	No	No	No	Jim Helm/Rick Dodds, (608) 267-7623
WY	08/31/97	WY	No	0	5	No	1WK-24RF	No	No	No	John Wagner, (307) 777-7082

Note: Cert. = certification; EPA = Environmental Protection Agency; EPA-GEN = requirements for the U.S. EPA general permit for storm water discharges from construction sites; NOI = notice of intent; P.E. = professional engineer; POC = point of contact; RF = rainfall; SWPPP = Storm Water Pollution Prevention Plan; WK = week.

¹ Permittees must conduct visual inspections of discharge to ensure: (1) there is no visible floating scum, oil, or other material; (2) the discharge causes no objectionable color contrast in the receiving stream; and (3) the discharge must result in no materials in the discharge in concentrations that are sufficient to be hazardous or otherwise detrimental to humans, aquatic life in a receiving stream, wildlife, or plant life.

² Fee is prorated over a five-year fixed period. For the first year, the fee is \$200 for five years; the second year the fee is \$140 for four years, and so forth.

³ Projects that disturb more than one acre, but less than three acres, of land are required to file a "letter of intent" and submit a sediment control plan. No permits or fees are required.

⁴ Based on acreage and geographic location.

Table A-1.
Summary of State and Federal General Permits for Storm Water Discharges Associated with Construction
Activity — 1996 (Continued)

State	Expiration date	Who has Federal facility authority?	Installation required to submit SWPPP with NOI?	No. of days prior to construction NOI due?	Permit covered area (acres)	Permit fee	Site inspection schedule	Are samples required?	Public notice required?	SWPPP P.E. Cert.	POC name and telephone number
Amer. Samoa	10/01/97	EPA-9	Yes ¹	2	5	No	1WK-24RF	No	No	No	Not applicable
Guam	10/01/97	EPA-9	Yes ²	2	5	No	1WK-24RF	No	No	No	Eugene Bromely, (415) 744-1906
Puerto Rico	10/01/97	EPA-2	No	2	5	No	1WK-24RF	No	No	No	Jose Rivera, (212) 264-1859
Virgin Islands	10/01/97	EPA-2	No	2	5	No	1WK-24RF	No	No	No	Jose Rivera, (212) 264-1859

Note: Cert. = certification; EPA = Environmental Protection Agency; EPA-GEN = requirements for the U.S. EPA general permit for storm water discharges from construction sites; NOI = notice on intent; P.E. = professional engineer; POC = point of contact; RF = rainfall; SWPPP = Storm Water Pollution Prevention Plan; WK = week.

¹ Permittees must submit a copy of all NOIs and SWPPPs to American Samoa EPA.

² Permittees must submit a copy of all NOIs and SWPPPs to Guam EPA.

APPENDIX B

Sample Construction Pollution
Prevention Plan

Sample Construction Pollution Prevention Plan

The following information was extracted from the U.S. Environmental Protection Agency, *Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices*, EPA Report No. EPA/833/R-92/005, October 1992.

HOMERVILLE APARTMENTS CONSTRUCTION POLLUTION PREVENTION PLAN

SITE DESCRIPTION			
Project Name and Location: (Latitude, Longitude, or Address)	Homerville Apartments 21 Broadview Avenue Center City, ANY State 00000	Owner Name and Address:	Quality Associates 11 Main Street Center City, ANY State 00000
Description: (Purpose and Types of Soil Disturbing Activities)	<p>This project will consist of three low-rise, attached apartment buildings with adjacent parking facilities.</p> <p>Soil disturbing activities will include: clearing and grubbing; installing a stabilized construction entrance, perimeter, and other erosion and sediment controls; grading; excavation for the sedimentation pond, storm sewer, utilities, and building foundations; construction of curb and gutter, road, and parking areas; and preparation for final planting and seeding.</p>		
Runoff Coefficient:	The final coefficient of runoff for the site will be $c = 0.5$.		
Site Area:	The site is approximately 11.0 acres of which 9.8 acres will be disturbed by construction activities.		
Sequence of Major Activities			
The order of activities will be as follows:			
<ol style="list-style-type: none"> 1. Install stabilized construction entrance 2. Clear and grub for earth dike and sediment basin 3. Install earth dike 4. Construct sedimentation basin 5. Continue clearing and grading 6. Pile topsoil 7. Stabilize denuded areas and stockpiles within 14 days of last construction activity in that area 8. Install utilities, storm sewer, curb and gutter 		<ol style="list-style-type: none"> 9. Apply stone to parking area and road 10. Construct apartment buildings 11. Complete grading and install permanent seeding and plantings 12. Complete final paving 13. Remove accumulated sediment from basin. 14. When all construction activity is complete and the site is stabilized, remove earth dike and reseed any areas disturbed by their removal. 	
Name of Receiving Waters:	The entire site will drain into Rocky Creek which is approximately one hundred yards from the site.		
CONTROLS			
Erosion and Sediment Controls			
Stabilization Practices			
<p>Temporary Stabilization - Top soil stock piles and disturbed portions of the site where construction activity temporarily ceases for at least 21 days will be stabilized with temporary seed and mulch no later than 14 days from the last construction activity in that area. The temporary seed shall be Rye (grain) applied at the rate of 120 pounds per acre. Prior to seeding, 2,000 pounds of ground agricultural limestone and 1,000 pounds of 10-10-10 fertilizer shall be applied to each acre to be stabilized. After seeding, each area shall be mulched with 4,000 pounds per acre of straw. The straw mulch is to be tacked into place by a disk with blades set nearly straight. Areas of the site which are to be paved will be temporarily stabilized by applying geotextile and stone sub-base until bituminous pavement can be applied.</p> <p>Permanent Stabilization - Disturbed portions of the site where construction activities permanently ceases shall be stabilized with permanent seed no later than 14 days after the last construction activity. The permanent seed mix shall consist of 80 lbs/acre tall fescue, and 40 lbs/acre kobe lespedeza. Prior to seeding, 4,000 pounds of ground agricultural limestone and 2,000 pounds of 10-10-10 fertilizer shall be applied to each acre to be stabilized. After seeding, each area shall be mulched with 4,000 pounds per acre of straw. The straw mulch is to be tacked into place by a disk with blades set nearly straight.</p>			

CONTROLS (Continued)

Structural Practices

Earth Dike - will be constructed along the uphill perimeter (north) of the site. A portion of the dike will divert runoff around the construction site. The remaining portion of the dike will collect runoff from the disturbed area and direct the runoff to the sediment basin.

Sediment Basin - will be constructed at the common drainage location on the south side of the construction site. The basin will be formed by constructing an embankment across an existing gully and excavating a storage pond with a volume of 36,000 cubic feet (0.82) acre feet. The basin will drain through a corrugated metal riser and outlet pipe to a rip rap outlet apron. Once construction activities are nearly complete, the accumulated sediment will be removed from the basin.

Storm Water Management

Storm water drainage will be provided by curb and gutter, storm sewer and catch basin, for the developed areas. The areas which are not developed will be graded at less than 0.5:1 and have permanent seeding or plantings. Two acres of the site will remain untouched and in its natural State. When construction is complete the entire site will drain to a wet detention basin. The wet detention basin will be in the location of the temporary sediment basin. When upslope areas are stabilized, the accumulated sediment will be removed from the sediment basin, and the areas on the sides of the basin will be planted with vegetation. The wet detention pond is designed with a permanent pool volume of 0.82 (acre-feet). This is equivalent to one inch of runoff for the entire drainage area. It is expected that this wet detention pond design will result in an 80 percent removal of total suspended solids from the site's storm water runoff. The pond has been designed by a professional engineer to keep peak flow rates from the two and ten year/24 hour storms at their pre-development rates. The outlet of the detention basin will be stabilized by a riprap apron.

OTHER CONTROLS

Waste Disposal:

Waste Materials

All waste materials will be collected and stored in a securely lidded metal dumpster rented from the ADF Waste Management Company, which is a licensed solid waste management company in Center City. The dumpster will meet all local Center City and any State solid waste management regulations. All trash and construction debris from the site will be deposited in the dumpster. The dumpster will be emptied a minimum of twice per week or more often if necessary, and the trash will be hauled to the Center City Dump. No construction waste materials will be buried onsite. All personnel will be instructed regarding the correct procedure for waste disposal. Notices stating these practices will be posted in the office trailer and Mr. Doe, the individual who manages the day-to-day site operations, will be responsible for seeing that these procedures are followed.

Hazardous Waste

All hazardous waste materials will be disposed of in the manner specified by local or State regulation or by the manufacturer. Site personnel will be instructed in these practices and Mr. Doe, the individual who manages day-to-day site operations, will be responsible for seeing that these practices are followed.

Sanitary Waste

All sanitary waste will be collected from the portable units a minimum of three times per week by the TIDEE Company, a licensed Center City sanitary waste management contractor, as required by local regulation.

Offsite Vehicle Tracking:

A stabilized construction entrance has been provided to help reduce vehicle tracking of sediments. The paved street adjacent to the site entrance will be swept daily to remove any excess mud, dirt or rock tracked from the site. Dump trucks hauling material from the construction site will be covered with a tarpaulin.

TIMING OF CONTROLS/MEASURES

As indicated in the Sequence of Major Activities, the earth dike, stabilized construction entrance and sediment basin will be constructed prior to clearing or grading of any other portions of the site. Areas where construction activity temporarily ceases for more than 21 days will be stabilized with a temporary seed and mulch within 14 days of the last disturbance. Once construction activity ceases permanently in an area, that area will be stabilized with permanent seed and mulch. After the entire site is stabilized, the accumulated sediment will be removed from the trap and the earth dike will be removed.

CERTIFICATION OF COMPLIANCE WITH FEDERAL, State, AND LOCAL REGULATIONS

The storm water pollution prevention plan reflects Center City requirements for storm water management and erosion and sediment control, as established in Center City ordinance 5-188. To ensure compliance, this plan was prepared in accordance with the Center City Storm Water Management, Erosion and Sediment Control Handbook, published by the Center City Department of Planning, Storm Water Management Section. There are no other applicable State or Federal requirements for sediment and erosion site plans (or permits), or storm water management site plans (or permits).

MAINTENANCE/INSPECTION PROCEDURES

Erosion and Sediment Control Inspection and Maintenance Practices

These are the inspection and maintenance practices that will be used to maintain erosion and sediment controls.

- Less than one half of the site will be denuded at one time.
- All control measures will be inspected at least once each week and following any storm event of 0.5 inches or greater.
- All measures will be maintained in good working order; if a repair is necessary, it will be initiated within 24 hours of report.
- Built up sediment will be removed from silt fence when it has reached one-third the height of the fence.
- Silt fence will be inspected for depth of sediment, tears, to see if the fabric is securely attached to the fence posts, and to see that the fence posts are firmly in the ground.
- The sediment basin will be inspected for depth of sediment, and built up sediment will be removed when it reaches 10 percent of the design capacity or at the end of the job.
- Diversion dike will be inspected and any breaches promptly repaired.
- Temporary and permanent seeding and planting will be inspected for bare spots, washouts, and healthy growth.
- A maintenance inspection report will be made after each inspection. A copy of the report form to be completed by the inspector is attached.
- Mr. Doe, site superintendent, will select three individuals who will be responsible for inspections, maintenance and repair activities, and filling out the inspection and maintenance report.
- Personnel selected for inspection and maintenance responsibilities will receive training from Mr. Doe. They will be trained in all the inspection and maintenance practices necessary for keeping the erosion and sediment controls used onsite in good working order.

MAINTENANCE/INSPECTION PROCEDURES (Continued)

Non-Storm Water Discharges

It is expected that the following non-storm water discharges will occur from the site during the construction period:

- Water from water line flushings.
- Pavement wash waters (where no spills or leaks of toxic or hazardous materials have occurred).
- Uncontaminated groundwater (from dewatering excavation).

All non-storm water discharges will be directed to the sediment basin prior to discharge.

INVENTORY FOR POLLUTION PREVENTION PLAN

The materials or substances listed below are expected to be present onsite during construction:

- Concrete
- Detergents
- Paints (enamel and latex)
- Metal Studs
- Concrete
- Tar
- Fertilizers
- Petroleum Based Products
- Cleaning Solvents
- Wood
- Masonry Block
- Roofing Shingles.

SPILL PREVENTION

Material Management Practices

The following are the material management practices that will be used to reduce the risk of spills or other accidental exposure of materials and substances to storm water runoff.

Good Housekeeping:

The following good housekeeping practices will be followed onsite during the construction project.

- An effort will be made to store only enough product required to do the job
- All materials stored onsite will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure
- Products will be kept in their original containers with the original manufacturer's label
- Substances will not be mixed with one another unless recommended by the manufacturer
- Whenever possible, all of a product will be used up before disposing of the container
- Manufacturers' recommendations for proper use and disposal will be followed
- The site superintendent will inspect daily to ensure proper use and disposal of materials onsite.

Hazardous Products:

These practices are used to reduce the risks associated with hazardous materials.

- Products will be kept in original containers unless they are not resealable
- Original labels and material safety data will be retained; they contain important product information
- If surplus product must be disposed of, manufacturers' or local and State recommended methods for proper disposal will be followed.

SPILL PREVENTION (Continued)

Product Specific Practices

The following product specific practices will be followed onsite:

Petroleum Products:

All onsite vehicles will be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers which are clearly labeled. Any asphalt substances used onsite will be applied according to the manufacturer's recommendations.

Fertilizers:

Fertilizers used will be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer will be worked into the soil to limit exposure to storm water. Storage will be in a covered shed. The contents of any partially used bags of fertilizer will be transferred to a sealable plastic bin to avoid spills.

Paints:

All containers will be tightly sealed and stored when not required for use. Excess paint will not be discharged to the storm sewer system but will be properly disposed of according to manufacturers' instructions or State and local regulations.

Concrete Trucks:

Concrete trucks will not be allowed to wash out or discharge surplus concrete or drum wash water on the site.

Spill Control Practices

In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be followed for spill prevention and cleanup:

- Manufacturers' recommended methods for spill cleanup will be clearly posted and site personnel will be made aware of the procedures and the location of the information and cleanup supplies.
- Materials and equipment necessary for spill cleanup will be kept in the material storage area onsite. Equipment and materials will include but not be limited to brooms, dust pans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal trash containers specifically for this purpose.
- All spills will be cleaned up immediately after discovery.
- The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
- Spills of toxic or hazardous material will be reported to the appropriate State or local government agency, regardless of the size.
- The spill prevention plan will be adjusted to include measures to prevent this type of spill from reoccurring and how to clean up the spill if there is another one. A description of the spill, what caused it, and the cleanup measures will also be included.
- Mr. Doe, the site superintendent responsible for the day-to-day site operations, will be the spill prevention and cleanup coordinator. He will designate at least three other site personnel who will receive spill prevention and cleanup training. These individuals will each become responsible for a particular phase of prevention and cleanup. The names of responsible spill personnel will be posted in the material storage area and in the office trailer onsite.

POLLUTION PREVENTION PLAN CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signed: _____

John R. Quality,
President
Quality Associates

Date: _____

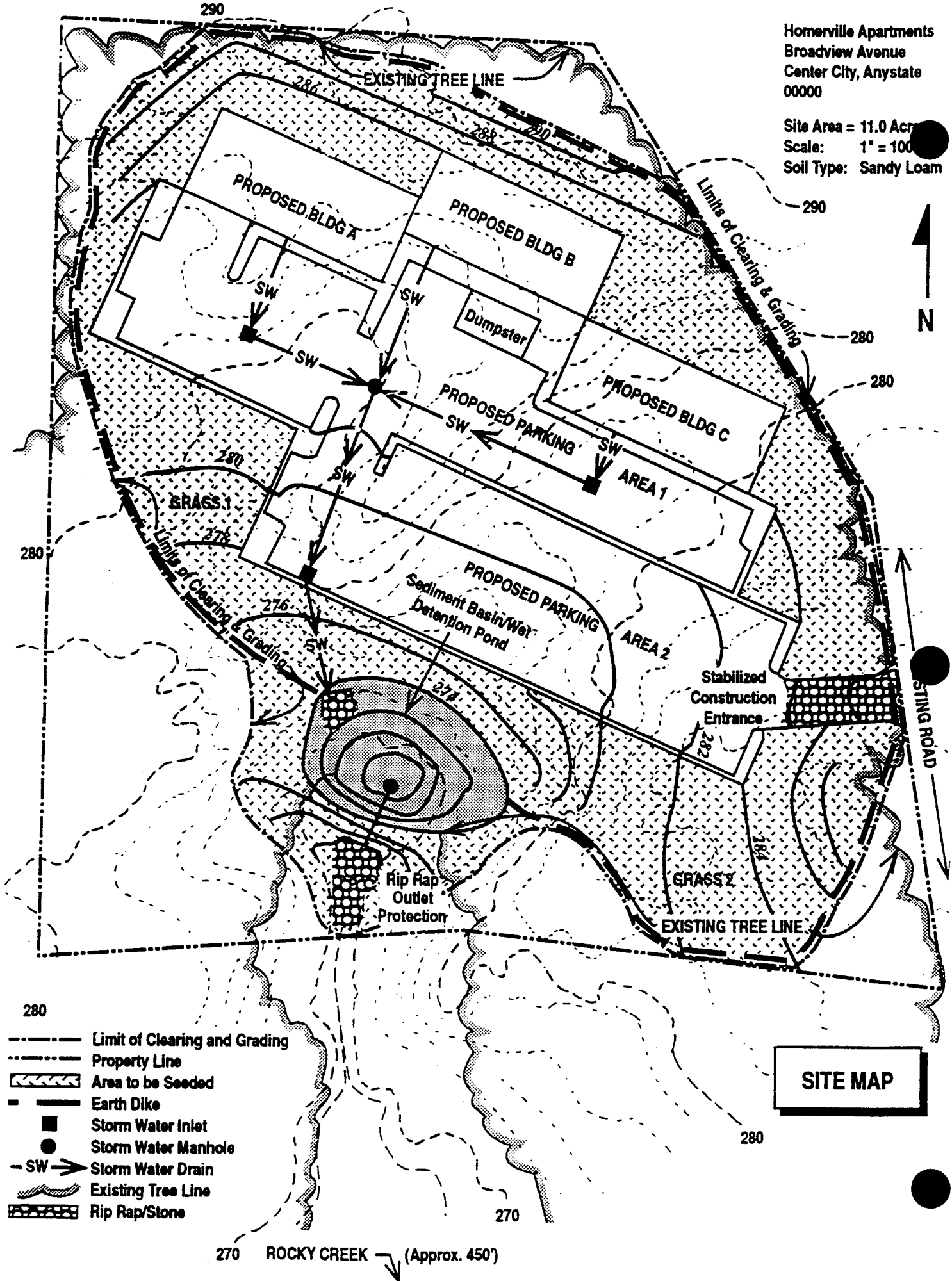
CONTRACTOR'S CERTIFICATION

I certify under penalty of law that I understand the terms and conditions of the general National Pollutant Discharge Elimination System (NPDES) permit that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification.

Signature	For	Responsible for
_____ Joseph Contractor, President Date: _____	Center City Const., Inc. 21 Elm Street Center City, Any State 00000 (123) 399-8765	General Contractor
_____ John Planter Vice President of Construction Date: _____	Green Grass, Inc. 4233 Center Road Outerville, Any State 00001 (123) 823-5678	Temporary and Permanent Stabilization
_____ Jim Kay, President Date: _____	Dirt Movers, Inc. 523 Lincoln Ave. Outerville, Any State 00001 (123) 823-8921	Stabilized Construction Entrance, Earth Dikes, Sediment Basin

Homerville Apartments
Broadview Avenue
Center City, Anystate
00000

Site Area = 11.0 Acres
Scale: 1" = 100'
Soil Type: Sandy Loam



SITE MAP

- 280
- Limit of Clearing and Grading
- Property Line
- Area to be Seeded
- Earth Dike
- Storm Water Inlet
- Storm Water Manhole
- SW → Storm Water Drain
- Existing Tree Line
- Rip Rap/Stone

HOMERVILLE APARTMENTS

STORM WATER POLLUTION PREVENTION PLAN

INSPECTION AND MAINTENANCE REPORT FORM

TO BE COMPLETED EVERY 7 DAYS AND WITHIN 24 HOURS OF
A RAINFALL EVENT OF 0.5 INCHES OR MORE

INSPECTOR: _____ DATE: _____

INSPECTOR'S QUALIFICATIONS:

DAYS SINCE LAST RAINFALL: _____ AMOUNT OF LAST RAINFALL _____ INCHES

STABILIZATION MEASURES

AREA	DATE SINCE LAST DISTURBED	DATE OF NEXT DISTURBANCE	STABILIZED? (YES/NO)	STABILIZED WITH	CONDITION
BLDG. A					
BLDG. B					
BLDG. C					
PRKNG. 1					
PRKNG. 2					
GRASS 1					
GRASS 2					

STABILIZATION REQUIRED:

TO BE PERFORMED BY: _____ ON OR BEFORE: _____

HOMERVILLE APARTMENTS
STORM WATER POLLUTION PREVENTION PLAN
INSPECTION AND MAINTENANCE REPORT FORM
STRUCTURAL CONTROLS

DATE: _____

EARTH DIKE:

FROM	TO	IS DIKE STABILIZED?	IS THERE EVIDENCE OF WASHOUT OR OVER-TOPPING?
BUILDING B	STABILIZED CONSTRUCTION ENTRANCE		
STABILIZED CONSTRUCTION ENTRANCE	SEDIMENT BASIN		
BUILDING B	SEDIMENT BASIN		

MAINTENANCE REQUIRED FOR EARTH DIKE:

TO BE PERFORMED BY: _____ ON OR BEFORE: _____

HOMERVILLE APARTMENTS

STORM WATER POLLUTION PREVENTION PLAN

INSPECTION AND MAINTENANCE REPORT FORM

SEDIMENT BASIN:

DEPTH OF SEDIMENT IN BASIN	CONDITION OF BASIN SIDE SLOPES	ANY EVIDENCE OF OVERTOPPING OF THE EMBANKMENT?	CONDITION OF OUTFALL FROM SEDIMENT BASIN

MAINTENANCE REQUIRED FOR SEDIMENT BASIN:

TO BE PERFORMED BY: _____ ON OR BEFORE: _____

OTHER CONTROLS

STABILIZED CONSTRUCTION ENTRANCE:

DOES MUCH SEDIMENT GET TRACKED ON TO ROAD?	IS THE GRAVEL CLEAN OR IS IT FILLED WITH SEDIMENT?	DOES ALL TRAFFIC USE THE STABILIZED ENTRANCE TO LEAVE THE SITE?	IS THE CULVERT BENEATH THE ENTRANCE WORKING?

MAINTENANCE REQUIRED FOR STABILIZED CONSTRUCTION ENTRANCE:

TO BE PERFORMED BY: _____ ON OR BEFORE: _____

HOMERVILLE APARTMENTS
STORM WATER POLLUTION PREVENTION PLAN
INSPECTION AND MAINTENANCE REPORT FORM

CHANGES REQUIRED TO THE POLLUTION PREVENTION PLAN:

REASONS FOR CHANGES:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

SIGNATURE: _____ **DATE:** _____

APPENDIX C

Available References for Storm Water
Discharges Associated with
Construction Activities

Available References for Storm Water Discharges Associated with Construction Activities

FEDERAL REGULATIONS

1. *Federal Register*, "National Pollutant Discharge Elimination System (NPDES) Permit Application Regulations for Storm Water Discharges," final rule, Volume 55, Number 222, 16 November 1990, pp. 47990 – 48091.
2. *Federal Register*, "NPDES General Permits and Reporting Requirements for Storm Water Discharges Associated with Industrial Activity," proposed rule, Volume 56, Number 159, 16 August 1991, pp. 40948 – 41006.
3. *Federal Register*, "NPDES Permit Application Regulations for Storm Water Discharges, Application Deadlines," Volume 56, Number 214, 5 November 1991, pp. 56548 – 56554.
4. *Federal Register*, "NPDES Application Deadlines, General Permit Requirements and Reporting Requirements for Storm Water Discharges Associated with Industrial Activity," final rule, Volume 57, Number 64, 2 April 1992, pp. 11394 – 11413.
5. *Federal Register*, "NPDES Storm Water Discharges Associated with Construction Sites," General Permits, notice, Volume 57, Number 175, 9 September 1992, pp. 41176 – 41235.
6. *Federal Register*, "NPDES, Request for Comment on Alternative Approaches for Phase II Storm Water Program," proposed rule, Volume 57, Number 175, 9 September 1992, pp. 41344 – 41356.
7. *Federal Register*, "NPDES General Permits for Storm Water Discharges from Construction Activities That Are Classified as Associated With Industrial Activity," Volume 57, No. 175, 9 September 1992, pp. 41209 – 41233.
8. *Federal Register*, "Final NPDES General Permits for Storm Water Discharges from Construction Sites," Volume 57, No. 187, 27 September 1992, 44412 – 44435.
9. Title 40, Code of Federal Regulations, Section 122.26.

FEDERAL EPA GUIDANCE MANUALS

1. U.S. Environmental Protection Agency, *Draft Sediment and Erosion Control, An Inventory of Current Practices*, EPA Office of Water Enforcement and Permits, prepared by Kamber Engineering, 20 April 1990.
2. U.S. Environmental Protection Agency, *Guidance Manual for the Preparation of NPDES Permit Applications for Storm Water Discharges Associated with Industrial Activity*, EPA Office of Water Enforcement and Permits, April 1991.
3. U.S. Environmental Protection Agency, *Draft Construction Site Storm Water Discharge Control, An Inventory of Current Practices*, EPA Office of Water Enforcement and Permits, prepared by Kamber Engineering, 26 June 1991.
4. U.S. Environmental Protection Agency, *Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices*, EPA Report No. EPA/833/R-92/001, October 1992. This report is available from the National Technical Information Service, 5285 Park Royal Road, Springfield, Va., 22161, (800) 553-NTIS. It is a useful and up-to-date reference on NPDES construction permit requirements for construction activities.

STATE GUIDANCE MANUALS

1. Storm Water Quality Task Force, *California Storm Water Best Management Practice Handbooks, Construction Handbook*, March 1993. This is another regional document, but it is also a good example of the application of EPA principles to regional conditions. It is available from Blue Print Service, 1700 Jefferson Street, Oakland, Cal., 95612, (510) 444-6771.
2. State of Maryland, *1983 Maryland Standards and Specifications for Soil and Erosion and Sediment Control*, Maryland Water Resources Administration, Soil Conservation Service, and State Soil Conservation Committee, April 1983.
3. State of North Carolina, *Erosion and Sediment Control Planning and Design Manual*, North Carolina Sedimentation Control Commission, Department of Natural Resources and Community Development, and Agricultural Extension Service, 1 September 1988.
4. Commonwealth of Pennsylvania, *Erosion and Sediment Pollution Control Program Manual*, Pennsylvania Department of Environmental Resources, Bureau of Soil and Water Conservation, April 1990.
5. Harris County/Harris County Flood Control District/City of Houston, *Storm Water Management Handbook for Construction Activities*, 17 September 1992. This report is specific to the Houston area, but it provides useful background information on how the EPA requirements will be met in this

area. It is available through the project consultant, Turner Collie & Braden, Inc., 5757 Woodway, Houston, Tex., 77057, (713) 780-4100.

6. Northern Virginia Planning District Commission, *BMP Handbook for the Occoquan Watershed*, prepared for the Occoquan Basin Nonpoint Pollution Management Program, August 1987.
7. Commonwealth of Virginia, *Virginia Erosion and Sediment Control Handbook*, Virginia Department of Conservation and Historical Preservation, Division of Soil & Water Conservation, second edition, 1980.
8. County of Fairfax, *Check List for Erosion and Sediment Control*, Fairfax County, Virginia, 1990 and 1987 editions.
9. Washington State, *Draft Storm Water Management Manual for the Puget Sound Basin*, Washington State Department of Ecology, 23 January 1992.
10. Washington State, *Standards for Storm Water Management for the Puget Sound Basin*, Washington State Department of Ecology, 29 July 1991.
11. State of Wisconsin, *Wisconsin Construction Site Best Management Practice Handbook*, Wisconsin Department of Natural Resources, Bureau of Water Resources Management, Non-Point Source and Land Management Section, June 1990.

DoD AND ARMY GUIDANCE

1. Army Regulation 200-1, *Environmental Protection and Enhancement*, "Chapter 3: Water Resources Management Program," 31 August 1993 (Preliminary Draft).
2. Technical Report EP-93/06, *A Summary of Best Management Practices for Non-Point Source Pollution*, U.S. Army Construction Engineering Research Laboratory (USACERL), August 1993. Copies available from the National Technical Information Service, 5285 Port Royal Road, Springfield, Va., 22161, (800) 553-NTIS.
3. Technical Report N-88/05/ADA197566, *Erosion Control Methods for Army Training Land Rehabilitation: A Survey of Current Technology*, USACERL, May 1988. Copies available from the National Technical Information Service, 5285 Port Royal Road, Springfield, Va., 22161, (800) 553-NTIS.
4. Memorandum for HQ, USAEC, CECC-E, Subject, *The National Pollutant Discharge Elimination System Storm Water Discharge Rule*, 10 September 1991.
5. Memorandum for HQ, USAEC, CECC-E, Subject, *ibid.*, 12 January 1993.

6. Memorandum for HQ, USAEC, CELD-ZE, Subject, *The National Pollutant Discharge Elimination System Storm Water Discharge Rule*, 8 March 1991.
7. Memorandum for ENVR-EP, Subject, *ibid.*, 23 January 1992.
8. Memorandum for HQ, USAEC, CECC-E, Subject, *ibid.*, 23 June 92.
9. U.S. Army Environmental Center, *Army Storm Water Permit Implementation Handbook*, 1994.
10. USACE Engineering Circular No. 1110 - 1 - 79, *Engineering and Design Environmental Protection Guide Specification*, March 1994.
11. Water Quality Information Paper No. 36, Army Environmental Hygiene Agency, *The National Pollutant Discharge Elimination System Storm Water Discharge Rule*, HSHB-ME-WM, 1 March 1991. Copies available by contacting the USAEHA Wastewater Management Branch at DSN 584-3816/3554 or (410) 671-3816.

PRIVATE-SECTOR GUIDANCE AND TECHNICAL MANUALS

1. S.J. Goldman, K. Jackson, and T.A. Bursztynsky, *Erosion and Sediment Control Handbook*, McGraw-Hill Book Company, New York, 1986.
2. B.J. Barfield, R.C. Warner, and C.T. Haan, *Applied Hydrology and Sedimentology for Disturbed Areas*, Oklahoma Technical Press, Stillwater, Okla., 1981.
3. Water Environment Federation, *Automatic Stormwater Sampling Made Easy*, 1993. This monograph describes a useful method of automatically collecting flow-proportional composite samples from an engineered drainage collection system during storms. The method is designed to assist a project manager in establishing field procedures for use in manholes, but with modifications it can be used in constructed channels and natural creeks as well. Order No. P01026GA, member price \$16.00, nonmember \$20.00. To order call: (800) 666-0206.
4. Water Environment Federation, *Water Quality Management Digest*, 1993. Water management, urban runoff, toxic pollutants, storm water, agricultural runoff, and regulations are discussed in this compendium of articles originally published in *Water Environment & Technology* and *Water Environment Research* or presented at the WEF Annual Conference. Order No. P0035GA, member price \$50.00, nonmember \$70.00. To order call: (800) 666-0206.
5. *Control of Wet Weather Water Quality Problems*, Water Environment Federation, May 1992. Experts in the field present information on the control of combined sewer overflows, NPDES storm water regulations, infiltration/inflow remedies, water quality monitoring, hydraulic modeling, and collection

system inspection and management practices. Proceedings from Specialty Conference, Indianapolis, Indiana. Order No. TT037GA, member price \$45.00, nonmember \$75.00. To order call: (800) 666-0206.

6. William DeGroot, Editor, *Stormwater Detention Facilities*, 1982. Proceedings of a conference cosponsored by the Engineering Foundation and the Urban Water Resources Research Council. \$34.00/outside U.S. \$40.80. To order call: (800) 548-ASCE.
7. *Stormwater Detention Outlet Control Structures*, 1985. Task Committee on the Design of Outlet Control Structures of the Committee on Hydraulic Structures of the Hydraulics Division. This volume addresses the Committee's findings regarding hydraulic function, water quality, public safety, maintenance, and aesthetic aspects of outlet controls, and includes results of an extensive literature search and survey of storm water management professionals. \$11.00/outside U.S. \$13.20. To order call: (800) 548-ASCE.

APPENDIX D

Sample Checklists and Forms for the
Construction General Permit

EPA CONSTRUCTION GENERAL PERMIT REQUIREMENT PRECONSTRUCTION CHECKLIST

Storm Water Pollution Prevention Plan

1. A site description including:
 - ☐ The nature of the activity
 - ☐ Intended sequence of major construction activities
 - ☐ The total area of the site
 - ☐ The area of the site that is expected to undergo excavation
 - ☐ The runoff coefficient of the site after construction is complete
 - ☐ Existing soil or storm water data
 - ☐ A site map with:
 - ☐ Drainage patterns
 - ☐ Approximate slopes after major grading
 - ☐ Area of soil disturbance
 - ☐ Outline of areas which will not be disturbed
 - ☐ Location of major structural and nonstructural controls
 - ☐ Areas where stabilization practices are expected to occur
 - ☐ Surface waters
 - ☐ Storm water discharge locations
 - ☐ The name of the receiving water(s)
2. A description of controls:
 - ☐ Erosion and sediment controls including:
 - ☐ Stabilization practices for all areas disturbed by construction
 - ☐ Structural practices for all drainage/discharge locations
 - ☐ Storm water management controls including:
 - ☐ Measures used to control pollutants occurring in storm water discharges after construction activities are complete
 - ☐ Velocity dissipation devices to provide nonerosive flow conditions from the discharge point along the length of any outfall channel
 - ☐ Other controls including:
 - ☐ Waste disposal practices which prevent discharge of solid materials to waters of the U.S.
 - ☐ Measures to minimize offsite tracking of sediments by construction vehicles
 - ☐ Measures to ensure compliance with State or local waste disposal, sanitary sewer, or septic system regulations
 - ☐ Description of the timing during the construction when measures will be implemented
3. State or local requirements incorporated into the plans
4. Inspection and maintenance procedures for control measures identified in the plan
5. Identification of allowable non-storm water discharges and pollution prevention measures
6. Contractor certification
7. Plan certification

EPA CONSTRUCTION GENERAL PERMIT CHECKLIST

Storm Water Pollution Prevention Plan Construction/Implementation Checklist

1. Maintain Records of Construction Activities
 - ☐ Dates when major grading activities occur
 - ☐ Dates when construction activities temporarily cease on a portion of the site
 - ☐ Dates when construction activities permanently cease on a portion of the site
 - ☐ Dates when stabilization measures are initiated on the site
2. Prepare inspection Reports summarizing:
 - ☐ Name of inspector
 - ☐ Qualifications of inspector
 - ☐ Measures/areas inspected
 - ☐ Observed conditions
 - ☐ Changes necessary to the SWPPP
3. Report Releases or Reportable Quantities of Oil or Hazardous Materials (if they occur):
 - ☐ Notify National Response Center (800) 424-8802 immediately
 - ☐ Notify permitting authority in writing within 14 days
 - ☐ Modify the pollution prevention plan to include:
 - ☐ the date of release
 - ☐ circumstances leading to the release
 - ☐ steps taken to prevent reoccurrence of the release
4. Modify Pollution Prevention Plan as necessary to:
 - ☐ Comply with minimum permit requirements when notified by EPA that the plan does not comply
 - ☐ Address a change in design, construction operation or maintenance which has an effect on the potential for discharge of pollutants
 - ☐ Prevent reoccurrence or reportable quantity releases of hazardous material or oil

EPA CONSTRUCTION GENERAL PERMIT CHECKLIST

Storm Water Pollution Prevention Plan Final Stabilization/ Termination Checklist

1. All soil disturbing activities are complete
2. Temporary erosion and sediment control measures have been removed or will be removed at an appropriate time
3. All areas of the construction site not otherwise covered by a permanent pavement or structure have been stabilized with a uniform perennial vegetative cover with a density of 70 percent or equivalent measures have been employed

**POLLUTION PREVENTION PLAN FOR STORM WATER DISCHARGE ASSOCIATED WITH
CONSTRUCTION ACTIVITIES
EROSION AND SEDIMENT CONTROL SELECTION CHECKLIST**

INSTRUCTIONS: THIS CHECKLIST LISTS THE MINIMUM SEDIMENT EROSION CONTROL REQUIREMENTS UNDER THE USEPA GENERAL PERMIT. CHECK [] EACH ITEM AND FILL IN THE BLANKS BELOW TO EVALUATE COMPLIANCE FOR EACH DRAINAGE AREA AND LOCATION. NOTE: THIS CHECKLIST WAS PREPARED FOR THE USEPA GENERAL PERMIT. REQUIREMENTS FOR STATE GENERAL PERMITS MAY VARY.

Stabilization Practices

- ☐ Stabilization will be initiated on all disturbed areas where construction activity will occur for a period of more than 21 calendar days by the 14th day after construction activity has permanently or temporarily ceased.

Stabilization measures to be used include:

- | | |
|--|--|
| <input type="checkbox"/> temporary seeding | <input type="checkbox"/> sod stabilization |
| <input type="checkbox"/> permanent seeding | <input type="checkbox"/> geotextiles |
| <input type="checkbox"/> mulching | <input type="checkbox"/> Other _____ |

Structural Practices

- ☐ Flows from upstream areas will be diverted from exposed soils to the degree attainable.

Measures to be used include:

- | | |
|---|---|
| <input type="checkbox"/> earth dike | <input type="checkbox"/> pipe slope drain |
| <input type="checkbox"/> drainage swale | <input type="checkbox"/> other _____ |
| <input type="checkbox"/> interceptor dike and swale | |

**Drainage locations serving less than 10
disturbed acres**

- ☐ Sediment controls will be installed

Controls used included:

- ☐ sediment basin
☐ sediment trap
☐ silt fence or equivalent controls along all sideslope and downslope boundaries

**Drainage locations serving 10 or more
disturbed acres**

- ☐ A sediment basin will be installed

- ☐ A sediment basin is **not** attainable on the site. Therefore, the following controls will be installed:

- ☐ sediment trap
☐ silt fence or equivalent along the sideslope and downslope boundaries

Sediment Basin Runoff Storage Calculation

_____	acres draining to the sediment basin
x	
3600	cubic feet of storage/acre
=	
_____	cubic feet of storage required for the basin.

Storm Water Pollution Prevention Plan
Construction General Permit
Inspection and Maintenance Report Form

To be completed every 7 days and within 24 hours of a rainfall event of 0.5 inches or more

Project: _____

Inspected By _____ Date: _____

Inspectors Qualifications: _____

Days Since Last Rainfall: _____ Amount of Last Rainfall _____ Inches

Vegetative Controls

AREA	DATE SINCE LAST DISTURBED	DATE OF NEXT DISTURBANCE	STABILIZED (yes/no)	STABILIZED WITH	CONDITION

STABILIZATION REQUIRED:

TO BE PERFORMED BY: _____ ON OR BEFORE: _____

SWPPP CERTIFICATION

Name_____

Title_____

Organization_____

Name of Construction Project_____

Location of Construction Project_____

" I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted, is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Printed Name_____

Signature_____

Title_____ Date Signed_____

NOTICE OF TERMINATION

NPDES No. _____

Name of Construction Project _____

Location of Construction Project: (if address is not available, locate approximate center of site by latitude and longitude to the nearest 15 seconds, or the section, township and range to the nearest quarter) _____

Operator:

Name _____

Address _____

Phone _____

Reason for Termination: _____

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted, is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Printed Name _____

Signature _____

Title _____ Date _____

Signatory Requirements

Sample Delegation Letter

Director
Water Management Division
Regulatory Authority
Anytown, USA 00000

Date

Dear Sir / Madam:

I am the Commanding Officer at _____ with responsibility for overall operations at Fort X. Under the provisions of 40CFR 122.22 & 123.25 [or state equivalent], I hereby delegate authority to persons in the following named positions as my duly authorized representatives. (Select from the following list, or modify, as appropriate.)

1. Director, Public Works Department, and
2. Chief, Environmental Division, DPW.

They will act on my behalf on matters concerning the NPDES storm water program.

Sincerely,

Commander
Fort X

cc

Contractor's Certification

I certify under penalty of law that I understand the terms and conditions of the general National Pollutant Discharge Elimination System (NPDES) permit that authorizes the storm water discharges associated with industrial activity from the construction activity identified as part of this certification.

Signature	Representing	Responsible for
Signature		
Date		
Signature		
Date		
Signature		
Date		
Signature		
Date		
Signature		
Date		
Signature		
Date		

APPENDIX E

Points of Contact for the
Army Storm Water Program

Points of Contact for the Army Storm Water Program

1. Office of the Director of Environmental Programs (ODEP):
Martin Elliott – (703) 693-0552, FAX: (703) 697-2802
2. U.S. Army Environmental Center (USAEC):
Billy Ray Scott – (410) 612-7073, FAX: (410) 671-1675
E-mail: brscott@aec1.apgea.army.mil
3. Construction Engineering Research Laboratory (CERL):
Rick Scholze – (217) 373-5590, FAX: (217) 373-3490
4. Army Center For Public Works:
Bob Ferlason – (703) 806-5201, DSN: 656-1540, FAX: (703) 806-5216
5. U.S. Army Center for Public Health Promotion and Preventive Medicine (USACHPPM): Wendy Mervine – (410) 671-3919, DSN: 584-3919, FAX: (410) 671-3633
6. U.S. Army Office of the Judge Advocate General,
Environmental Law Division:
MAJ Mark Graham – (703) 696-1230, FAX: (703) 696-2940
7. U.S. Army Forces Command (FORSCOM):
Ron Nichols – (404) 669-7688, FAX: (404) 669-7827
8. U.S. Army Training and Doctrine Command (TRADOC):
Mike Cochran – (804) 727-2424, FAX: (804) 727-2362
9. U.S. National Guard Bureau (NGB):
MAJ Greg Costello – (703) 607-7982, FAX: (703) 607-7993
10. U.S. Army Reserve Command (ARCOM):
Charlie Combs – (404) 629-8266, FAX: (404) 629-8229
11. U.S. Army Corps of Engineers (CESAM-EN-FE):
Ronnie Gibson, Mobile, Ala., (334) 690-2688, FAX: (334) 690-2424

APPENDIX F

U.S. Army Corps of Engineers:
Commonly Asked Storm Water
Questions and Answers

U.S. Army Corps of Engineers: Commonly Asked Storm Water Questions and Answers

The following information was quoted from references 4 through 8 under the *DoD and Army Guidance* section in Appendix C:

1. **In the planning process for a new project, when should the Corps begin considering the storm water discharges associated with the project?**
 - a. The Corps should address any anticipated storm water discharges of a project in the feasibility stage of the planning process. The project manager should contact the appropriate state or EPA office if any unusual or significant impacts to state waters are anticipated from the storm water discharge. By making such early contacts we should be able to avoid any future problems if we need to secure a permit for the project.
2. **Are activities such as the grading of roads, the disking of drop zones, the maintenance of fire breaks, and military training exercises, which disturb five acres or more of land, covered by the storm water rule?**
 - a. The definition of construction activity appears to extend to clearing and grading activities. Thus, under a strict interpretation of the rule, the activities listed above may well be subject to regulation under the storm water rule as long as they: 1) disturb five acres or more of land, and 2) involve a point source discharge into a water of the United States. However, states and EPA regions may vary on how strictly they interpret the definition of construction activity. It would be advisable to check with the appropriate state or EPA office to determine whether these activities will in fact be subject to the rule within that state or EPA region.
3. **How does the five acre rule work?**
 - a. Section 122.26(b)(14)(x) of the storm water regulation provides that construction activity including clearing, grading and excavation activities, except operations that result in the disturbance of less than five acres of total land area which are not part of a larger common plan of development or sale are subject to the storm water regulation permit requirements [40 CFR § 122.26(b)(14)(x)]. Thus, if a construction activity disturbs less than five acres of land and is not contiguous with any other construction activity, then the activity would not be subject to the storm water permit requirements. However, if four acres of land have

previously been developed and an additional one acre of land will be added to the development, then the construction of the one acre will require a storm water permit.

4. Who should file the Notices of Intent (NOIs) for general permits?

- a. Generally, the Corps should apply for all storm water permits required, including NOIs. However, there are two exceptions to this policy: 1) where the Corps has an ongoing project, the contractor should apply for the permit; and 2) when it would be in the best interests of the Corps, based on the unique nature of the project, for the contractor to apply for the permit. This latter exception should not be used with the sole purpose of avoiding an increased Corps workload.
- b. In answer 23 of the 23 June 1992 guidance, we stated that the Corps should apply for individual storm water permits because the storm water rule requires that the permittee apply for an individual permit 90 days prior to commencing construction activities. If we were to require the contractor to apply for an individual permit, this would in most cases delay construction, because the Corps typically does not award contracts more than 90 days before the commencement of construction.
- c. When a project can be covered by a general permit, the 90-day time constraint is no longer present; however, the Corps should still file the NOI. The EPA general permit for construction requires that the permittee file an NOI only two days prior to beginning construction. Some state general permits have similar provisions. We believe that it is in the Corps' best interest to maintain control over the permit process. Furthermore, since the Corps will be preparing the pollution prevention plans, it is appropriate for us to file the NOI memorializing our intention that the pollution prevention plan will be followed during construction. Finally, by applying for storm water permits ourselves, we can avoid projects being halted for noncompliance with the storm water rule because of a contractor missing a filing date due to inexperience with the storm water program.
- d. Although it is unlikely, some cost-shared projects may involve storm water discharges that continue beyond the completion of the project. In these limited cases, the local sponsor should apply for the storm water permits covering these continuing discharges. The Corps would still apply for those permits covering the actual construction.

5. When should the Corps apply for storm water permits?

- a. The Corps would obtain the appropriate storm water permits (either individual or general) prior to completion of the design phase of a project. This ensures that any changes to a pollution prevention plan can be made, or any specific permit requirements can be addressed prior to concluding any contractual relationship we may have with a design firm.
- b. This also ensures that the pollution prevention plan and any specific permit requirements are acceptable prior to the issuance of a solicitation for the construction phase of the project. As explained in item 6 below, we will include in the specifications for the construction phase of the project the pollution prevention plan and any storm water permit requirements.
- c. If, due to scheduling problems, we are forced to issue a solicitation for the construction phase of a project prior to either securing an individual storm water permit or to receiving assurances from the EPA or state that it will allow us to proceed under an NOI that we have filed, then we should delay bid opening until we have either received the individual permit or received such an assurance.
- d. Although NOIs for some general permits can be filed as late as two days prior to commencing construction, it is important to file these NOIs prior to issuing the solicitation for the construction phase of the project in the event that a state or the EPA rejects the NOI and requires us to file an individual permit.

6. When the Corps applies for an individual storm water permit or files an NOI, how does the Corps bind the contractor to the terms of the permit?

- a. The Corps should make the construction contractor fully aware of the permit requirements and the pollution prevention plan by including the permit requirements and the pollution prevention plan in the project specifications for the construction phase of the project, which would then become part of the construction contract upon award.

7. When the Corps leases Corps land to others, how do we ensure the storm water rule is followed?

- a. Corps grantees should apply directly to the state, or the EPA office having jurisdiction, to receive a storm water permit. At the same time, the grantees are required by the terms of their lease with the Corps to comply with all applicable environmental laws and secure all necessary permits pursuant to these laws. If a Corps grantee were to fail to apply for a storm water permit, the Corps could consider this a violation of the lease or grant. Furthermore, the Corps could contact the state or the EPA to recommend that they pursue an enforcement action.

8. Should the Corps be paying state storm water permit fees?

- a. In most cases the Corps should be paying state and EPA storm water permit fees. It is well established that the applicability of state regulations to Federal activities depends on whether Congress has waived Federal supremacy for that activity. As a general proposition, Federal facilities are subject to state regulatory requirements only to the extent that Congress has clearly and unambiguously waived Federal supremacy. Section 313 of the CWA states that the Federal government shall be:

subject to, and comply with, all Federal, State, interstate, and local requirements . . . respecting the control and abatement of water pollution in the same manner, and to the same extent as any nongovernmental entity, including the payment of reasonable service charges. [emphasis added]

Conceding that section 313 is an explicit waiver of Federal supremacy, the Corps should pay any "reasonable service charges" associated with the processing of a Section 402 storm water permit.

- b. The question then becomes whether the state storm water fees are "reasonable." In *Massachusetts v. United States*, the United States Supreme Court set up the following three criteria for determining whether a state fee is reasonable, 435 U.S. 444 (1978):
- i. The fee must be nondiscriminatory; e.g., the state cannot exempt itself from the fee, but charge the United States.
 - ii. The fee must be a fair approximation of the costs of the benefits received.
 - iii. The fee must not be structured to produce revenue for the state over and above the administrative costs of issuing the permit and the cost of providing program services to the permittee.
- c. All district counsels should examine the state storm water fees with these three criteria in mind. Although some of the storm water fees are insignificant presently, state environmental fees have a tendency to increase dramatically over time. If any state fee is violating the above criteria, we need to discover this now before we establish a history of paying the fee. District counsels should work together while conducting these analyses, especially where district jurisdictions overlap in a single state. Please notify CECC-E of your findings. If you have any questions concerning these inquiries, please contact CECC-E.
- d. It is also important to realize that this guidance advising the payment of Section 402 storm water permit fees does not alter our previous guidance that the Corps should not pay Section 401 water quality certification fees. The latter position is based on the premise that CWA Section 404(t) does not provide an explicit waiver of supremacy for the

payment of Section 401 fees and that the waiver of supremacy in Section 313 does not apply to Section 401.

9. Should the Corps pay fines to the states?

- a. In accordance with *U.S. Department of Energy v. Ohio*, the Corps should only pay those fines that are prospective in nature — those fines assessed by a state to coerce the Corps into complying with legitimate state requirements. 112 S. Ct. 1627 (1992). The Corps should not pay any fines that are punitive; that is, those levied by a state to punish the Corps for past instances where we may not have complied fully with state laws.

10. Has the EPA issued any guidance on pollution prevention plans?

- a. Yes. In October 1992 the EPA published *Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices*. Copies can be secured by calling NTIS (703) 487-4650. The order numbers for the industrial activity and construction activity documents are PB 92-235969 and PB 92-235951, respectively.

11. Has the Corps developed any model pollution prevention plans?

- a. No. We will do so only if the EPA guidance documents on pollution prevention plans prove to be inadequate for our purposes.

12. What is the status of the five acre rule after *Natural Resources Defense Council, Inc. v. United States Environmental Protection Agency*?

- a. In *NRDC v. EPA* the United States Court of Appeals for the Ninth Circuit held the five acre rule invalid. 966 F.2d 1292, 1305 (9th Cir. 1992). The court remanded the issue for further examination and the EPA was tasked with promulgating another rule discussing, among other provisions, the five acre rule. Until the EPA reaches a final determination on the five acre rule and publishes a final rule addressing this issue, the EPA and the states will not seek any storm water permits for construction activities disturbing less than five acres of land.

13. How does the five acre rule apply to projects that collectively disturb five acres or more of land, yet have no individual parcels that are five acres or larger in size?

- a. Although legally the Corps is not necessarily required to apply for storm water permits for such projects when no single construction area is five acres or more in size, as a matter of policy, the Corps should seek storm water permits when the construction areas as a whole reach the five acre threshold and these parcels are all *integrally related* to the same project. Two factors that could be used in determining whether

projects are integrally related are whether the work performed is all covered by a single contract or whether all of the work is incorporated into the same planning documents.

- b. Flood control projects are a good example of this type of project. Land clearing along a flood control channel may disturb many separate tracts of uplands. Although collectively the acreage disturbed may well exceed five acres in size. Arguably these tracts should not be regulated under the storm water rule since they are not contiguous. However, we will apply for permits for these tracts as a matter of policy.
 - c. It is important to distinguish these projects from, for example, independent construction projects that may occur on a military installation. Independent military construction projects, even if they are occurring simultaneously, that do not disturb five acres or more of land, are not subject to the storm water rule as long as they are not contiguous with other ongoing or related construction projects that cause a combined land disturbance of five acres or more.
 - d. For example, if an installation were building a billet on one side of the installation and a Post Exchange on the other side of the installation and neither building disturbed five acres or more of land, then neither building would be subject to the rule, even if they collectively disturbed five acres or more of land. These projects should be regarded as independent construction activities, regardless of whether they are both mentioned in the installation's master plan.
- 14. How does the five acre rule work when a new construction project that is less than five acres in size is contiguous with a completed construction project and the combined acreage of the two sites exceeds five acres?**
- a. In answer number six of the June 1992 guidance, we stated that "if four acres of land have previously been developed and an additional one acre of land will be added to the development, then the construction of the one acre will require a storm water permit." This statement requires some clarification.
 - b. In developed areas, it would be difficult to conduct a construction project that would not be contiguous with some earlier construction project; however, this does not mean that all new construction projects in developed areas, irrespective of their size, are subject to the permit requirements. When the EPA established the five acre threshold, it made a determination to limit the number of construction activities that would be encompassed by the storm water rule. This approach would prove to be meaningless in developed areas if we were not to impose some limitation on how contiguous sites are regarded.
 - c. The Corps should apply for a storm water permit whenever it has two projects that: 1) are related (i.e., not independent), 2) are proceeding

simultaneously, 3) are contiguous, and 4) are disturbing five or more acres of land collectively. Additionally, the Corps should apply for storm water permits for those phased construction projects that in any one year would disturb less than five acres of land, but would disturb five acres or more of land during the life of the project, if they meet the above criteria.

- d. If you have questions pertaining to a particular construction project and whether the five acre rule applies, contact the state or the EPA storm water office with jurisdiction over the project. The main issue to consider when making such a determination is that the EPA developed the contiguous projects rule to prevent developers from circumventing the storm water rule by building their developments in four acre parcels. The contiguous rule prevents such intentional segmentation.
- 15. If the Corps were to have a project with several construction sites exceeding five acres in size, would the Corps be able to apply for a single storm water permit to cover the entire project?**
- a. This will depend on the permitting authority. Contact the state or the EPA regional office within your district's jurisdiction to obtain this information.
- 16. Does the five acre rule apply to grantees operating on Corps land?**
- a. Yes. Corps grantees are also bound by the five acre rule.
- 17. Does the five acre rule apply to forestry and farming activities?**
- a. Section 122.3(e) of the storm water discharge rule specifically exempts discharges from the following activities:
 - i. "[n]on point-source agricultural and silviculture activities, including storm water runoff from orchards, cultivated crops, pastures, range lands, and forest lands, but not discharges from concentrated animal feeding operations . . . , discharges from concentrated aquatic animal production facilities . . . , discharges to aquaculture projects . . . , and discharges from silvicultural point sources 40 C.F.R. § 123.3(e).
 - ii. Section 122.27(b) defines "silvicultural point source" as any "discernible, confined and discrete conveyance related to rock crushing, gravel washing, log sorting, or log storage facilities which are operated in connection with silvicultural activities and from which pollutants are discharged into the waters of the United States." 40 C.F.R. § 122.27(b).
 - b. Considering the above exemptions, generally farming and forestry activities are not subject to the storm water rule, regardless of the acreage

disturbed. In the case of forestry activities, however, the Corps must be sure to determine whether the forestry activity involves any of the point source discharges listed in Section 122.27(b).

18. Can the deputy district engineer sign storm water permit applications in lieu of the district engineer?

- a. In the 23 June 1992 guidance we stated in question 25 that the district engineer must sign the storm water permit applications. This is based on EPA guidance which requires that "senior executive officer[s] having responsibility for the overall operation of a principle geographic unit of the agency" sign the permit applications. *Guidance Manual for the Preparation of NPDES Permit Applications for Storm Water Discharges Associated with Industrial Activity*, § 3.7, p. 20. This guidance does not, however, preclude the district engineer from delegating this authority by letter to the deputy district engineer or division chief level.

19. What should we do if we missed the 1 October 1992 permit application deadline?

- a. Contact the appropriate state or EPA office immediately and begin the application process.

20. Who issues the various storm water permits, the EPA or the states?

- a. States with authorized NPDES storm water permit programs will issue the storm water permits. Otherwise, the EPA will issue the storm water permits.

21. Doesn't the storm water rule only cover discharges from point sources?

- a. Although the storm water rule only applies to point source discharges into the waters of the United States, EPA's definition of point source is extremely broad. Section 122.2 defines point source as:

any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collecting system, or vessel or other floating craft from which pollutants are or may be discharged. The term does not include return flows from irrigated agriculture or agricultural storm water runoff. (40 C.F.R. § 122.2).

This definition includes "conveyances" that were not created by the "discharger," as long as they are "reasonably likely to be the means by which pollutants are ultimately deposited into [waters of the United States]." (See *Federal Register*, Volume 55, No. 222, 16 November 1990, p. 47997.)

- 22. Are there any exemptions from the storm water permit requirements that apply to Corps activities?**
- a. Section 122.3(b) provides an exemption for any discharge of dredged or fill material into the waters of the United States that is regulated under Section 404 of the Clean Water Act (CWA).
- 23. Would this exemption apply to confined dredged material disposal facilities (CDF)?**
- a. Yes. The construction, maintenance and operation of a CDF built in the waters of the United States and thus regulated under Section 404 of the CWA, would not require a permit under the storm water rule.
- 24. Would the exemption also apply to the construction, maintenance and operation of an upland CDF?**
- a. Not necessarily. If the construction of an upland CDF disturbed five acres or more of land and resulted in a point source storm water discharge into the waters of the United States, then the construction activity would be subject to the storm water discharge permit requirements since such discharges would not be regulated under Section 404 of the CWA. However, those discharges resulting from the disposal of dredged material at the upland CDF once the construction activities were completed, would not be subject to regulation under the storm water regulation since they would be subject to regulation under Section 404 of the CWA.
- 25. What is the relationship between discharges of dredged or fill material into waters of the United States that are regulated under Section 404 of the Clean Water Act (CWA) and those discharges into the waters of the United States that are regulated under the Section 402 storm water rule?**
- a. Section 402 of the CWA regulates essentially all discharges of pollutants into the waters of the United States, with the exception of discharges of dredged or fill material which are regulated under Section 404. EPA reiterates this in Section 122.3(b) of its NPDES regulations where it states that "[d]ischarges of dredged or fill material into waters of the United States which are regulated under Section 404 of the CWA" do not require NPDES permits. 40 C.F.R. § 122.3(b).
- b. Thus, if a discharge is regulated under Section 404 and the necessary Section 404(b)(1) evaluation and environmental documentation address storm water runoff, no Section 402 NPDES storm water permit is required. However, some projects unavoidably will involve both Section 402 storm water discharges and Section 404 discharges of dredged or fill material. In such cases the Corps should seek a Section 402 permit covering the discharges from the portions of the project that would not otherwise be covered in a Section 404(b)(1) evaluation.

- c. For example, if the Corps is building a flood control project and the work involves Section 404 discharges of fill to construct levees and Section 402 discharges from upland construction activities, then the Corps should in its Section 404(b)(1) evaluation for the Section 404 discharges address any storm water discharges that may be incidental to those Section 404 discharges and, in addition, seek a Section 402 storm water permit for the storm water discharges associated with the upland construction activities. The Section 402 permit should only cover non-Section 404 upland construction activities.
 - d. The same is true for private projects regulated by the Corps' Section 404 program. If the discharges associated with an applicant's project are subject to regulation under Section 404 and the Corps addresses, in the Section 404(b)(1) evaluation, any storm water runoff that may be incidental to the project, then the applicant is not required to apply for a storm water permit. However, if the project involves non-Section 404 regulated discharges, then the applicant may have to secure a Section 402 storm water permit in addition to a Section 404 permit.
- 26. For future projects and those still in planning, how do we ensure that the storm water discharge discussion in our Section 404(b)(1) evaluations is adequate?**
- a. For future projects and those still in planning, it is imperative that all Section 404(b)(1) evaluations adequately address storm water runoff from those parts of the project that involved discharges of dredged or fill material exempted as Section 404 discharges. Since the Corps has not developed any specific guidance on preparing the storm water discussion portion of the Section 404(b)(1) analyses, we recommend that you conform to the storm water requirements of the state or EPA region having jurisdiction over the project. This approach will obviate the need for applying for a Section 402 storm water permit.
- 27. Does the Corps have to apply for Section 402 storm water discharge permits for existing projects that involved or continue to involve Section 404 discharges, yet where the Section 404(b)(1) evaluations do not address storm water discharges?**
- a. If a project continues to generate storm water discharges into the waters of the United States that either are not regulated under Section 404, or were not addressed in a Section 404(b)(1) evaluation, then the Corps should either: 1) apply for a storm water permit, or 2) amend the Section 404(b)(1) evaluation to address these storm water discharges. If you choose to amend the Section 404(b)(1) evaluation, follow the state or EPA requirements as discussed in answer 26 above.

28. Why must the Corps address storm water discharges associated with Section 404 regulated discharges when the Section 404 exemption applies?

- a. The Corps has chosen as a matter of policy to address all storm water discharges associated with our projects. Because of the Section 404 exemption, the Corps is not required to secure permits from the state or EPA permitting authorities when all storm water discharges from a project are associated with a regulated Section 404 discharge. However, in the interest of being good environmental stewards, the Corps has determined that we will comply (without actually seeking a storm water permit) with the spirit of the storm water rule by fully addressing even those storm water discharges exempted from coverage under the rule in our Section 404(b)(1) analyses.

29. Does the Section 404(r) procedure obviate the need for the Corps to apply for a storm water permit?

- a. Section 404(r) exempts Section 404 discharges associated with Federal projects specifically authorized by Congress, from regulation under Section 404 and state Section 404 requirements, provided the Corps submits to Congress prior to any discharge, an environmental impact statement which includes a Section 404(b)(1) evaluation fully discussing the effects of such discharges. Although the Section 404(r) language mentions Section 402, the exemption only applies to Section 404 discharges of dredged or fill material. Thus, even in those projects in which the Corps uses the Section 404(r) process, the Corps is required to apply for a Section 402 permit if the project contains Section 402 storm water discharges separate and apart from the parts of the project involving Section 404 discharges.

30. If the Corps applies for an individual permit, and then a state issues a general permit covering the activity before the individual permit is processed, can the Corps pursue general permit coverage?

- a. Yes. In this situation the state should waive the requirement for an individual permit.

31. If EPA approves group permit applications, would the permits also cover construction on these military installations?

- a. No. The construction on these installations would have to be permitted separately.

32. How does the individual permit process work for construction activities?

- a. If a general permit is not available covering construction activities, the Corps will have to apply for an individual permit. Although the various states may have a different process for applying for an individual permit covering a construction project, it will probably be similar to the

process outlined by the EPA for its individual construction permits. Under the EPA process the applicant must submit Form 1 and a narrative description of the project to the appropriate state agency or EPA region 90 days prior to commencing construction. The state agency or EPA region should make a determination on the permit within the 90 day review period. The length of the review process may vary from state to state; thus, it is imperative that the permittee work closely with the state or EPA to ensure that the permits are issued prior to the construction start date.

- 33. Who should apply for an individual storm water permit for a construction activity, the Corps, the Architect/Engineer (AE), or the general contractor?**
 - a. The Corps should apply for the storm water permit. The Corps should, however, use the AE to whatever extent is necessary to prepare the permit application and the pollution prevention plan.
- 34. If the Corps does construction work for either a military installation or a local sponsor, who should apply for the permit?**
 - a. The Corps should apply for the permit as discussed above.
- 35. Who should sign a Corps storm water permit application?**
 - a. The district engineer.
- 36. How should contracts be written to include the storm water permit requirements?**
 - a. First, the permit and the pollution prevention plan should be physically attached to the contract or fully incorporated within the contract. Second, a special provision should be included in the contract to put the contractor on notice that it will be bound by the terms of the permit and the pollution prevention plan.
- 37. What should a district do if the EPA or a state refuses to issue a permit or attempts to assign an unreasonable permit fee?**
 - a. If either of these situations arise, the district should, through the appropriate district and division channels, contact CECW-Z or CEMP-ZA, and CECC-E to determine the appropriate course of action.
- 38. If the EPA or a state does not process our application in time to meet our schedule, do we suspend work?**
 - a. It is very important that the Corps work closely with EPA and the states to ensure that this situation never arises. However, if it does, the Corps should not proceed with construction until the permit has been processed.

- 39. Will there be any additional reporting or testing requirements for a construction activity after a storm water permit is issued?**
- a. Typically no. However, in some cases the EPA or a state may require additional reporting or testing requirements by issuing permit conditions.
- 40. Are there any effluent testing requirements for construction activities?**
- a. Typically no. Unless the construction activity involves some toxic or hazardous materials that are not properly maintained and removed, effluent testing would not appear to be necessary; however, a state or the EPA may require effluent testing even in the absence of these materials.
- 41. Is the general contractor responsible for taking steps to ensure that storm water discharges do not occur after construction has been completed?**
- a. Yes. The contractor should leave the construction site in such a manner that erosion and runoff are controlled in conformance with the approved sediment control plans in the contract.
- 42. Who should enforce the storm water permit conditions?**
- a. The storm water permit conditions are contract requirements. The district engineer should administratively enforce the permit conditions as he would any other contract requirement. In the event that violations occur, EPA and/or the state may require other specific enforcement measures to correct the problems. All corrective actions must be directed through the appropriate contracting officer.
- 43. If you have further questions that cannot be answered by the appropriate state agency or EPA region, please contact Bill Sapp at (202) 272-0035.**

APPENDIX G

Glossary

Glossary

A-E	=	architectural and engineering
AMC	=	Army Materiel Command
BMP	=	best management practice
CFR	=	Code of Federal Regulations
CWA	=	Clean Water Act
DENIX	=	Defense Environmental Network Information Exchange
DoD	=	Department of Defense
DSN	=	Defense Switched Network
EO	=	Environmental Office(r)
EPA	=	Environmental Protection Agency
ESO	=	Engineering Services Office
FORSCOM	=	Forces Command
ISCP	=	installation spill contingency plan
NOI	=	Notice of Intent
NOT	=	Notice of Termination
NOV	=	Notice of Violation
NPDES	=	National Pollutant Discharge Elimination System
NRDC	=	National Resource Defense Counsel
POC	=	point of contact
RFP	=	request for proposals
RQ	=	reportable quantity
SWPPP	=	Storm Water Pollution Prevention Plan

TRADOC = Training and Doctrine Command

USACE = U.S. Army Corps of Engineers

USACERL = U.S. Army Construction Engineering Research Laboratory

USACHPPM = U.S. Army Center for Health Promotion and Preventive Medicine

USAEC = U.S. Army Environmental Center

USGS = U.S. Geological Survey

WEF = Water Environment Federation

WWW = World Wide Web

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